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REGULATION OF MARRIAGE

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Read April 4, Chicago Medical Society

One time a friend writing to me from Switzerland said — "I never saw so many idiots. Cretins, they call them. I saw a pair of them married in the cathedral and the priest blessed their offspring. I am told they are very prolific and that their output of children will be idiotic. The marriage of Cretins should certainly be prohibited by law." That the marriage of those carrying hereditary taint should not be permitted is the general opinion and the same is sustained by the science of eugenics, yet not a few there are who emphatically say *no*. Those whose negative arises from religious belief cannot, of course, be considered, for the question must be settled by cognate facts.

That certain persons should not be permitted parenthood appears in the well-known facts concerning the Jukes family, so skillfully worked out by Dr. Dugdale. Still more striking are the facts given by Conklin "a young man of good family, after his discharge from the Continental Army, who mated with a feeble-minded girl in New Jersey. Later, the young man married a Quakeress and founded a family which has since become distinguished in trade and in the learned professions.

From the feeble-minded daughter of the first marriage there were 480 descendants. (**A**)

From the eight normal children of the second marriage there were only 365 descendants. (**B**)

A	Status of Descendants	B
46	Normal	362
143	Feeble Minded	0
36	Illegitimate	0
33	Sexually Immoral	1
3	Syphilities	0
3	Criminals	0
3	Epileptic	0
8	Kept House of Ill-Fame	0
1	Insane	1
24	Alcoholic	1
82	Died in Infancy	15

This history constitutes a striking proof of the tendency toward the inheritance of feeble-mindedness. But it has been argued that "the proportion of syphilities, criminals, sexually immoral, epileptics and insane is scarcely greater, in some respects not so great, as might be found among 480 individuals chosen at random, the greater proportion of whom it might be assumed possessed the advantage of having been reared in a better family environment."

Plainly, this argument cannot be accepted, because what is abnormal should be compared with the normal, not with an average from normal and abnormal. Then, again, the statement in comparison with the average is not true. If it were, then the average of defectives in general life would be 45.5%.

But these considerations, though most important and interesting, are not needed for my purpose as the simple assumption of restricting the procreation of the unfit will be all sufficient.

Marriage Regulation.

We first recognize that the male human being is a natural polygamist. This may be true also of the female, but I let that pass. The point is, marriage is not required for procreation and it is an institution necessitated by social expediency. The law, therefore, rightly regulates it. It is unlawful for persons of a certain age to marry, even with the consent of parents. It is unlawful for brother and sister to marry, and in certain states cousins cannot lawfully marry. In other states the law forbids the marriage of whites and blacks. Further, the law empowers only certain persons to perform the ceremony and requires the procurement of a license from a certain official as a prerequisite. Obviously, society could, if considered necessary, impose further restrictions, or indeed any restrictions it wished to, the whole matter being controlled by expediency. The question is not — how far may society go? but — how far shall it go?

Eugenics Laws.

Indiana has two eugenics laws. The first, passed in 1905, legalizes sterilization, and has for its prime object the prevention of the procreation of the unfit. This law contemplates but does not impose solely, sterilization by vasectomy. By this method impregnation only is prevented, the power of coitus being unimpaired. It, therefore, does not interfere with marriage, nor does it relate thereto, but is referred to because some men who have been sterilized by vasectomy have married with full knowledge by their wives that they could not be fathers, and now have permanent and happy homes, though childless.

Indiana's other eugenics law was passed in 1905 also, and commands that: "No license shall be issued except upon written and verified application. Such application shall contain a statement of the full Christian and surname, color, occupation, birthplace, residence, and ages of the parties, whether the marriage contemplated is the first, second, or other marriage, together with the full Christian and surnames, residence, color, occupation and birthplace of their parents, including the maiden name of the mother, together with such other facts as may be necessary to determine whether any legal impediment to the proposed marriage exists.

"Applications for license to marry shall be uniform throughout the State, and it is hereby made the duty of the State Board of Health to furnish a form, therefore, to the several clerks at once upon the approval of this act: Provided, That the State Board of Health may revise said forms so furnished from time to time as may be advisable.

The law further commands:

"No license to marry shall be issued where either of the contracting parties is an imbecile, epileptic, of unsound mind or under guardianship as a person of unsound mind, nor to any male person who is or has been within five years an inmate of any county asylum or home for indigent persons, unless it satisfactorily appears that the cause of such condition has been removed and that such male applicant is able to support a family and likely to so continue, nor shall any license issue when either of the contracting persons is afflicted with a transmissable disease, or at the time of making application is under the influence of an intoxicating liquor or narcotic drug.

"In those cases when the right to a license is not made to appear the clerk shall refuse the issue of same. At once upon such refusal he shall certify the proceeding to the Circuit Court without formality of expense to the applicants, who shall be notified by him of such action. Such application shall thereupon be at the earliest practicable time heard by the circuit judge without a jury, in court or in chambers during the term or in vacation as the case may be, and in finding that a license ought to

issue or ought not to issue shall be final and the clerk shall act in accordance therewith, the true intent of this action being to secure for the applicants a hearing by said judge without affirmative action by said applicants, and to give notice to them of such hearing, its time and place, without delay or expense.

"If persons resident of this State with intent to evade the provisions of Section 1 and Section 3 go into another state and there have their marriage solemnized with the intention of afterward returning and residing in this state, and do so return and reside in this state, such marriage shall be void, and such parties, upon returning to this state, shall be subjected to all the penalties provided in this act: Provided, This Section shall not apply to persons who in good faith become or are citizens of any other state.

"Whoever procures the issuance of a license to marry by any false statement, representation or pretense shall be fined in any sum not exceeding five hundred dollars.

"Whoever being duly authorized to solemnize marriage in this state knowingly joins in marriage persons who have not complied with the statute relative to the procurement of marriage license shall be fined in any sum not less than twenty-five dollars.

"Every clerk of the Circuit Court who shall issue any license contrary to the provisions of this act shall be fined in any sum not less than twenty-five dollars nor more than one hundred dollars."

As commanded, the State Board of Health prepared the appended blank forms of application for license to marry.

Application for Marriage License — Female.

Application is hereby made for a license for the marriageof ——— to ——— upon the following statement of fact relative to said parties: 1. The full Christian and surname of the woman is ———. 2. Color ———. 3. Where born?———. 4. When born ———. 5. Present residence ———. 6. Present occupation ———. 7. Full Christian and surname of father ———. 8. His color ———. 9. His birthplace ———. 10. His occupation ———. 11. His residence ———. 12. Full Christian and maiden name of mother ———. 13. Her color ———. 14. Her occupation ———. 15. Her birthplace ———. 16. Her residence ———. 17. Has the female contracting party been an inmate of any county asylum or home for indigent persons within the last five years?———. 21. If so, how and when?———. 22. Is the female contracting party afflicted with epilepsy, tuberculosis, venereal or any other contagious or transmissible disease?———. 23. Is she an imbecile, feeble-minded, idiotic or insane, or is she under guardianship as a person of unsound mind?———. Signature of applicant———.

Application for Marriage License — Male.

Application is hereby made for a license for the marriage of ——— to ———, upon the following statement of fact relative to said parties: 1. The full Christian and surname of the man is ———. 2. Color ———. 3. Where born?———. 4. When born?———. 5. Pres-

ent residence ———. 6. Present occupation ———. 7. If no occupation, what means has the male contracting party of supporting a family?———. 8. Is the male contracting party of nearer blood kin to the female contracting party than second cousin? ———. 9. Full Christian and surname of father ———. 10. His color ———. 11. His birthplace ———. 12. His occupation ———. 13. His residence ———. 14. Full Christian and maiden name of mother ———. 15. Her color ———. 16. Her occupation ———. 17. Her birthplace ———. 18. Her residence ———. 19. Has the male contracting party been an inmate of any county asylum or home for indigent persons within the last five years? ———. 20. If so, is he now able to support a family and likely to so continue? ———. 21. Is this his first marriage? ———. 22. If not, how often has he been married? ———. 23. Has such prior marriage, or marriages been dissolved ———. 24. If so, how? ———. 24. When? ———. 26. Is the male contracting party afflicted with epilepsy, tuberculosis, venereal, or any other contagious or transmissible disease? ———. 27. Is he an imbecile, feeble-minded, idiotic or insane, or is he under guardianship as a person of unsound mind? ———. Signature of applicant ———. *Affidavit follows here.*

At first there was manifest some opposition and in instances very harsh statements were made, but finally this all died out, and now not the slightest opposition appears. The highest court has upheld the law in the case of a very rich and prominent man who was luetic and knew it, who was refused a license to marry. He thereupon went to Kentucky and was married, and upon return to Indiana, in due time, the marriage was declared null and void. So, if people with certain hereditary disease get married in other states to avoid Indiana's statute, they must remain out of the state or suffer the penalty.

As the enforcement of the law depends upon the county clerks, all new ones are sent a special letter from the State Board of Health which gives the argument of the law and makes plain the benefits its rigid enforcement will bring to the state. Of course, this is to educate and to arouse the interest of new officials. We have not sufficient data for conclusions, but it is true licenses to marry are denied daily in the state to those who should not marry and, although marriage is not necessary for procreation, still it is certain the law has done something toward the end at which it is aimed.

But its great fault lies in its inadequate provisions for enforcement. To correct this defect the following bill was introduced into the last General Assembly in 1911. It passed the House of Representatives, but failed in the Senate.

Section 1. Be it enacted by the General Assembly of the State of Indiana, that it shall be unlawful for county clerks to issue a license to marry to any male who fails to present a medical certificate showing him to be free from blood taint of feeble-mindedness or insanity, free from open pulmonary tuberculosis, and free from all venereal diseases, said certificate to be sworn to by a licensed physician and to be filed with the usual application for license to marry.

Section 2. The certificate required in Section 1 shall read as follows, to wit:

I, ———, being a legally licensed physician, do certify that I have carefully and fully examined ———, having applied the recognized clinical and laboratory tests of scientific medicine and find him to be free from all symptoms and taint of venereal disease, free from open pulmonary tuberculosis, and free from blood taint of feeble-mindedness and insanity.

Section 3. If persons resident of this state, with intent to evade the provisions of this act, go into another state and there have their marriage solemnized with the intention of afterward returning to this state and residing here, and do so return and reside in this state, such marriage shall be null and void and such parties, upon returning to this state, shall be subject to all the penalties provided for in this act.

Section 4. Violation of any provisions of this act shall be punishment by a fine of one hundred dollars.

Section 5. All acts or parts of acts in conflict with this act are repealed.

A second law directly relating to marriage makes it unlawful for first cousins to marry, which law seems in harmony with our present knowledge of hereditary concerning the degenerative influences of consanguinity.

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THE BACTERIAL CONTAMINATION OF BREAD

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The literature upon the bacteriology of bread is relatively meager. Thus far, work seems to have been done mainly upon the so-called "diseases" of bread and upon the question whether bacteria that are contained in the flour, yeast and milk or that are introduced by workmen survive the baking temperature.

The results of investigations upon the diseases of bread are very uniform. The [1] best known bacterial disease is one in which gossamer-like threads are formed when the bread is cut or broken. This characteristic is usually, though not always, present in sticky or slimy bread. Organisms given the name of B. mesentericus, B. mesentericus panis viscosi I and II, B. mesentericus fuscus, B. panis and B. liodermis have been isolated from the sticky and slimy bread. B. prodigiosus [2] causes "bleeding bread." B. mesentericus vulgatus [3] is found in sour bread.

Whether non-spore producing bacteria survive the baking temperature must still be regarded as unsettled. The bacteria found in bread are so similar to those in flour [4] that it would be logical to think that the same bacteria survive. Stiegeler,[5] however, believes that all bread diseases caused by micro-organisms, with the exception of ropy bread, are of exterior origin.

Roussel [6] and Marchand [7] inoculated unbaked dough with B. tuberculosis and recovered cultures in the baked bread which were pathogenic for animals. Atwater [8], B. Fenyvessy and L. Dienes [9] also believe from their experiments that bacteria may survive the baking temperature. On the other hand, Auché [10] also taking B. tuberculosis cultures found that in every case the baking temperature destroyed the pathogenicity of the cultures for laboratory animals. He also found B. coli, B. typhosus, several types of B. mesentericus, staphylococcus and streptococcus were non-resistant to the baking temperature. Leveran [11] believes that bread,

[1] Lafar — Handbuch der Technischen Myhologie, 1908, pp. 520-525.
[2] Stiegeler — Pure Products, 1907, p. 467.
[3] (See [1]).
[4] (See [1]).
[5] Stiegeler — Pure Products, 1907, pp. 464-469.
[6] Roussel — *Ann. d'hyg.*, 1907, 4s., 8, p. 443.
[7] Marchand — Experiment Station Record, United States Department of Agriculture, 1910, 22, p. 64.
[8] Atwater — United States Department of Agriculture, *Farmers' Bulletin*, 389, p. 34.
[9] B. Fenyvessy and L. Dienes — *Ztschr. f. Hyg.*, 1911, 69, p. 223.
[10] Auché — Compt. Rend. Soc. de Biol.,1909, 66, p. 800.
[11] Leveran — *Journal American Medical Association*, 1910, 54, p. 62.

when it comes from the oven, is probably sterile and Belli [12] goes a step further and says that not only is the bread sterile when it comes from the oven, but it remains so for 22 hours.

There is little published evidence on the spreading of disease by bread. It has been the suspected vehicle in some typhoid cases. Kayser,[13] in his report on typhoid in Strassburg, noted that typhoid had spread especially in the neighborhood of two bakeries and that bakers were particularly likely to have typhoid. Several cases of typhoid [14] in the Government Hospital for the Insane at Washington, D. C., were traced to the fact that the attendant who cut the bread as his first duty in the morning, had been taking care of a typhoid patient in his home.

It seems as likely that disease would be transmitted from the contaminated outside of bread in some such manner as the above examples indicate, and from exposure to dust, flies, etc., as from any pathogenic bacteria which might survive the baking temperature in the interior of the loaf.

With the plan of determining the degree of bacterial contamination of the outside of bread, 100 loaves were collected from various districts in the north, south and west sides of Chicago. The loaves were about the same size, ranging from 345 g. to 375 g. They were oblong in shape. The exposed surface was, therefore, about the same in all the loaves. The shops from which the samples were chosen differed greatly in conditions of sanitation. There was every degree of cleanliness from the clean shop where the bread wrapped in oiled paper,, was kept in glass cases, to the dirty shop where the bread was kept upon a counter, far from clean, freely exposed to dust, flies and to handling by the customers.

Each loaf of bread was taken to the laboratory as wrapped when purchased, since this imitated the conditions under which the bread would ordinarily be used.

The entire loaf was then swabbed with wet sterile cotton and the cotton thoroughly rinsed in 10 c.c. of sterile water. From this suitable dilutions were made.

The media used in the experiments were gelatin, lactose-litmus-agar and lactose broth, all of which were made according to the rules given in "Standard Methods of Water Analysis."

One c.c. of the original suspension and 1 c.c. of each of its dilutions were plated upon gelatin and lactose-litmus-agar. The gelatin plates of the first 50 loaves were incubated at exactly 20° C. for 72 hours, those of the last 50 at room temperature (which was practically 20° C.) for 72 hours, and the lactose-litmus-agar plates at 37° C. for 24 hours before making the colony count. The count, as the table shows, was much lower when the

[12] Belli — Centralbl. Hyg., 1907, 2, p. 359.
[13] Kayser — München Med. Wchnschr., 1909, 56, p. 1,066.
[14] Lumsden — Bulletin No. 78, Hygienic Laboratory, United States Public Health and Marine Hospital Service, p. 165.

bread was kept under clean conditions than when the conditions were dirty. All acid colonies were picked and special search made for B. coli and streptococci. These were chosen as types, since they are both common and give some indication as to the cleanliness of conditions. B. coli was isolated from 3 loaves. Two of these loaves were purchased in very dirty shops. The third loaf came from a fairly clean store. Streptococci were isolated from 30 samples. Six cultures of streptococci were tested by the usual fermentation methods in order to determine their classification. The results were as follows:

STREPTOCOCCI

	Saccharose	Raffinose	Salicin	Mannite	Lactose	Inulin	Classification
1	+	−	+	−	−	−	Strept. equinus
2	+	−	+	−	+	−	
3	+	−	+	−	+	−	
4	+	−	+	+	+	−	Strept. faecalis
5	+	−	+	+	+	−	" "
6	+	−	+	+	+	−	" "

One c.c. of the original suspension from each loaf (representing one-tenth of surface) was inoculated into each of five fermentation tubes containing lactose broth. These were incubated at 37° C. for 24 hours. When gas production occurred during that time (17 cases), the tubes were plated out upon gelatin and lactose-litmus-agar and the plates examined for B. coli. This organism was found on three plates. In one tube fermentation was due to B. cloacæ, in the remaining 13 tubes to varieties of B. proteus. I am indebted to Professor E. O. Jordan in connection with this work.

TABLE I.

UNWRAPPED BREAD

No. of Loaves	Conditions under which bread was kept	Colony count per loaf						No. of Loaves giving		
		Lactose-Litmus-Agar			Gelatin			Gas-producing organism	B. coli	Streptococcus
		Average	Mini.	Maxi.	Average	Mini.	Maxi.			
31	Dirty	64,970	690	1,630,000	14,092	180	120,000	8	2	14
31	Fair	3,117	180	32,000	3,952	220	20,000	7	1	8
18	Clean	835	80	5,000	2,537	160	14,000	2	0	5

WRAPPED BREAD

9	Fair	848	220	3,000	1,058	120	3,200	0	0	3
11	Clean	371	40	2,200	532	80	2,000	0	0	3

TABLE II.

Per cent of samples with	Unwrapped Bread	Wrapped Bread
More than 10,000 bacteria*	17	0
1,000-10,000 bacteria	45	15
Less than 1,000 bacteria	38	85

*Agar at 37° C.

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THE CONSERVATION OF FOOD PRODUCTS BY REFRIGERATION

DR. P. H. BRYCE
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Read before the American Public Health Association, Havana, Cuba, December, 1911.

I have, within the last several years, had occasion to investigate the subject taken for my paper and have been surprised at its many phases as affecting public health. Many years ago I learned from personal observation and experiment that milk could be long maintained sweet, even in hot weather if carefully handled in clean utensils during milking and immediately afterwards reduced by cooling to 40° F., and then placed in an ice storage chamber. Doctor C. E. North in his paper last year before this Association told of how at 350 miles from New York he was able, by co-operation and scientific methods to have milk similarly cooled at the farms or at a central station, and even in hot weather to deliver milk two days old in New York and maintain an average bacterial count of under 30,000 bacteria per c.c.

Those who are familiar with the methods of inspection, killing and cold storage in the great packing houses, are equally familiar with the fact that healthy meat is maintained in the most perfect condition by a temperature of 32° for two, three and even for four months. Fish if frozen for equally long periods is kept with very satisfactory results; while it is further possible with the latter, if chilled, as the motto is, "from the keel or schooner through the cold storage warehouse and refrigeration car till it reached the consumer" to deliver fish for several months after taking in better condition than those which we get often which are only twenty-four hours old.

Perhaps, however, the most remarkable evolution of the science has been shown in the cold storage of fruits, since this has made it possible to put California strawberries in London in a better condition than they are often received from the Mediterranean, and it further has enabled the South to supply them to all the Northern States in the winter and spring months in as good and better a state, even if higher in price, as the local fruit in the summer months.

To illustrate it may be stated that the Bureau of Plant Industry at Washington has experimentally shown that more than 90% of the difficulties in the storage and transportation of fruits are the result of not following the simple rules of ensuring sound fruit, carefully picked and packed, quickly cooled after harvesting and transporting it to the markets in properly constructed regriferator cars, cooled when necessary *en route*. Thus

in a table given to show this the best packed fruit, as oranges, arrived at New York from California with only 0.5% defective and but 10% after three weeks kept in cold storage, while ordinary commercial handling with cold storage had a loss of 22% in three weeks. An even better result was obtained for the same period with properly packed California grapes. Illustrating the opposite condition, the Report of the Canadian Department of Agriculture for 1909 states that of some 900,000 barrels of apples exported to the British market in 1909 it would have been better for the shippers and for the credit of Canadian fruit "if one third of the apples exported had never been shipped." Similarly the Washington Report states that Florida lost $500,000 and California $1,500,000 worth in 1909 of marketed fruit due directly to decay; and when it is stated that of probably 15,000,000 barrels of apples grown in Canada in 1909 only so small an amount was exported, the economic losses to the growers and the high prices to the consumers will both be realized as of prime importance both from the economic and public health standpoints. It becomes, therefore, of interest to recall for a moment the physical laws which enter into this much neglected practice of refrigeration.

Upon heat depend all the vital energies of matter, whether animal or vegetable, and while it determines the germination, growth and maturing of these, yet it is plain that similar changes must equally go on in all organic tissues, when they are deprived of life, if the heat remains still present, and if the other conditions, as of moisture are favorable for the development, on them and in them, of other living organisms as bacteria or fungi. As it is the degree of heat which measures the amount of molecular motion in any substance it is apparent if we are to prevent or limit this action in substances to be kept for food that we must eliminate the heat present in them. As the normal temperature of animals is 100° F. and that of fruits on the hot earth is often as great, it is apparent that to remove this heat we must cause its radiation in cold chambers, evaporate it by currents of air and by convection through these movements of air of unequal temperature. To illustrate by a single example. When an animal has been slaughtered in the abattoir we proceed to remove its animal heat as rapidly as is found possible. The specific heat of meat is about 0.8 as compared with water and if we take a dressed carcass as being 700 lbs. this means that to reduce the temperature from say 100° to 30° F. in some 36 hours, one B. T. U. must be removed for every pound for each of the degrees between 90° F. and 30° F. by some cold producing agency as ice or an ice making machine. In effect the melting 140 lbs. of ice would be required with about one-third more daily to maintain it cool when refrigeration has taken place.

Probably about the same amount of cold is required to reduce the temperature of seven barrels of apples or an equal bulk of strawberries. A concrete case of what is actual practice will be better appreciated, when it is

stated that a car load of oranges which represents in bulk about 150 barrels, requires the application of all the cold which can be produced by a 10 ton capacity ice machine to reduce the temperature of a well insulated car from 80° F. to 40° F. in some 20 hours, which is only at the rate of 2° per hour for the car. In well insulated structures it is further necessary to supply cold at the rate of about 2 B. T. U. for every square foot of wall surface per twenty-four hours to hold an even temperature; but it will readily be seen that with the best construction possible the shaking of a car and its rapid movement through a hot climate, as from California, makes the transportation of fruit a very difficult problem. Yet in practice it is found possible by two recoolings by cold air during transit to have fruit arrive in New York in the condition already illustrated.

But the production of cold is not alone the problem of refrigeration. As the bacteriologist will appreciate, the amount of moisture present or the relative humidity of the cold storage chamber is of almost equal importance with the temperature, since in a saturated air moulds are known to grow on meat at temperatures much below freezing point. Hence it is a point found in practice quite difficult to always maintain a relative humidity of about 75% when it is remembered that at low temperatures the small amount of moisture required to saturate does not permit a fall of temperature of more than two or three degrees to occur if saturation is to be avoided. Hence provision for the constant changing of the air around the stored articles is essential to successful results and so the problem of the ventilation of the chamber always enters into the question. Remembering further the great range in outside temperatures throughout a year, it will be apparent that the methods of constructing non-conducting walls and roofs of cold storage warehouses and compartments have come to be a science to which special engineers have devoted much time and intelligence. But when the amount of refrigeration has been determined for the capacity of any warehouse or amount of food, we still have left to consider the mechanical side of how to produce the cold. How little the general or even professional public have hitherto understood of what is required, may be appreciated when I say that I have learned of not more than two universities in any country which have arranged a course of study in the science of refrigerating engineering and I know of nothing wherein so many questions of physics are involved. Leaving out its application for the moment to most varied products, there is the primary question of whether to adopt the Co_2, So_2 or NH_3 machine and, if as is now common in America, the *Ammonia process* is selected, then the next point to be determined is whether it shall be the direct expansion and compression method of producing cold with anhydrous ammonia or whether it will prove more effective and economical to use the absorption system and a saturated aqueous

ammonia solution, and then after this whether the flooding system would add effectiveness.

The importance of all this will be seen when it is seen that not only must there be a machine adequate for maintaining the requisite amount of cold, but this machine must also be operated at the highest point of efficiency, since the success and application of cold storage like other processes will in the end be determined not from the health standpoint but from the financial or commercial standpoint of profit or loss.

I have said enough to draw the attention of the Association to some of the problems involved in Refrigeration and in concluding have to say that I know of no single study we are engaged in, which demands more serious attention from the health point on the part of every health officer, whether federal, state or municipal, than this of the preservation by cold of the food of the people.

Discussion.

Doctor Snow:

In California we are interested in experiments on cold storage preservation of foods. Our Legislature last spring had this subject brought before it in an interesting way through bills relating to the importation of oysters from the Atlantic Coast. It was evident that there is no uniformity of opinion on the practical details of this problem. The bill, which was finally defeated, provided that oysters being shipped into California must be shipped in the original shell and must not be longer than four days in transit and storage before sale to the consumer. Doctor Bryce has spoken of apples especially, but probably all of us agree with him that this Association should appoint a committee on standardization of cold storage methods in general, this committee to consider not only the application of the principles of cold storage by companies engaged in this industry, but the proper selection of foods for cold storage and necessary precautions to be taken in marketing products after release from cold storage plants. The various committees of this Association appointed in the past to report on standard methods of scientific technique have done invaluable work, and a new committee assigned this problem would undoubtedly be of great service.

Doctor Dowling:

We have a great deal of refrigerated meat shipped from Omaha and Kansas City and I would like to ask how long meat will keep, after taken from cold storage, when exposed to the air?

Also your experience in the handling of refrigerated eggs? How long will eggs keep fresh when removed from cold storage to the average country store?

Doctor Rankin:

The most important point which Doctor Bryce's paper raises, and one that I think this Association should note, and possibly take some definite action on, is the importance of Medical Sociology in its relation to public health.

We all recognize the fact that health work is, to a large extent, dependent upon the practitioners of medicine, it is from them that we get our vital statistics, accurate or inaccurate, complete or incomplete, upon which intelligent public health work is based. For over two thousand years the relation of the physician to the public has been the relation of an attendant to a patient. This relation has been intimate and confidential, the public have been excluded and so the habit of thought has grown and become firmly fixed in the profession to regard the

individual and not the group or community or public. The communicability of diseases gives the physician a relation to the public which the old habit of individual consideration to a large extent minimized. We must in some way bring the question of Medical Sociology more prominently before the mind of the rank and file of the profession.

I do not believe that this Association could take more important action than to appoint a committee to draft a resolution calling upon the American Association of Medical Colleges to stress the importance of the subject of Medical Sociology as a part of the curriculum of the medical schools of our country.

Doctor Roberts:

Having in mind the fact of the greatly increased cost of living in our cities and the failure of the wages of working people of the more poorly paid class to increase commensurately with this cost, we are considering the project of a municipal ice supply for the benefit of those who buy their food in small quantities paying thereby more for it and thus adding in the long run to its already high price.

We are somewhat at sea as to how to go about the establishment of this supply. I will, therefore, be very glad to hear from anyone having any practical experience with an undertaking of this kind in their own city.

Mr. F. W. Bell:

I am especially interested in Doctor Bryce's paper in view of the bill that has been proposed by the Federal Government of the United States. If I interpret Doctor Bryce's paper correctly he wishes to encourage refrigeration, while the action of the United States Government is rather contrary limiting the amount of refrigeration for such short periods of time that it is going to be commercially impossible to make all these things and to keep them so that people can get them at all times and seasons of the year. The egg supply of our country is practically all harvested, (if I may be allowed to use that expression) in the Spring of the year, and under this proposed law these eggs can not be kept until the following winter as they have been and are now being kept. Eggs are a necessary food supply and it is questionable whether the action of the Government is correct in this particular. It is a very important question for us to study out and find out that they are suitable for food purposes after long periods in the refrigerators.

Doctor Bryce:

In reference to the various questions which have come up in this discussion, I may reply by taking up first the question of its scientific and economic aspects from a health standpoint. The large mechanical problems in refrigeration and engineering questions would form ample subject for discussion, but I do not propose to discuss them now. I may simply say this, that of all questions which I have ever attempted to discuss whether in its bearing on sociological or economic science, I have never touched any one that seems to be more unlimited than this. Doctor Snow comes from a country where oysters brought from the east coast are being sent and expected to keep until at any rate the shells are opened. It is a well ascertained fact that all frozen products such as mutton from Australia arrive in London in a perfect condition, and the question is whether it is going to be good when it reaches the hands of the consumers. For instance, the mutton arrives in London in a frozen state, is taken to a cold storage warehouse, but it has got to come through two or three stages of gradually rising temperature in order that the tissues of the meat be not torn. So it means one, two or three days of the mutton after coming from Australia to be thawed out and be put in the hands of the consumer. It is then in much the same condition as local meat.

It would depend upon whether the oysters had been frozen as to whether the oysters could be exposed in the front of a meat shop and as to whether they would be good for hours or

for days. If taken from the shell immediately on being taken from the water and placed in a temperature of 32°F., it could be possible to keep them in a wholesome condition for some days. Doctor Dowling's question is answered in the same manner.

Meat when it comes from Chicago has to be chilled and kept at thirty-two degrees, slightly stiff, although the meat is not frozen hard. Taken from cold storage in Chicago and sent to New York, meat is perfectly good at the end of a week or more, being taken out from storage from day to day that for to-morrow, taken out today. I would insist upon this matter, that in all shops there must be a large cooling room with proper humidity if we are going to have our products keep perfectly from day to day.

From the point of sanitation and sociology, I need hardly say that it depends upon the class of the food products that we are to estimate their value as world foods and the class of people produced.

The very essence of the problem is found in the question that was raised here as to whether the action taken by some legislatures recently in regard to the time foods should be in cold storage is necessary and wise or not. We all know that the Trust may have greatly extended the long continuance of food under storage conditions. But as to other results we may take the apples of Canada as an illustration. The apples are picked and packed there and in October shipped to Liverpool which port is absolutely glutted with barrels of apples from October to November. They reach the market in Liverpool often in such a state that they do not pay the exporter anything; they only pay the commission man and the transportation companies, nor does the farmer who grew them make much. The absence of cold storage caused their making nothing and there was the loss of proper profit on the nine hundred thousand barrels that were exported. These are questions that argue for cold storage. With cold storage not only would the apple market in Canada have had its ample supply of apples at reasonable prices in February and March, but they could be exported till April. So when people accuse the cold storage man of making prices high, they are quite wrong to blame him alone. It is the non-use of cold storage that makes prices high, as apples will decay soon they are not cold storaged and the quantity is lessened. If you place at once in cold storage your supply of apples, then from October to March the people would meet with even prices. It is the same with oranges, only you cannot load the market with oranges kept over long periods, as you can with some other fruits. They have their limitations much more than such fruits as apples.

When Chinese eggs were seized last spring in Montreal, my friend, an expert, told me he was asked to examine them. It appears the process is to break them up and sterilize and freeze them. They may be indeed fresher and in far better condition that those eggs that had come from local farms. When you get eggs from the farm there may be one or two out of every dozen bad and may have been collected a week or more. If the producer can guarantee the eggs fresh today, still it means a weekly collection of eggs in the country. If they are perfect at the start they then have to hold them at a temperature of thirty-two degrees. You have to start the very first day to apply refrigeration and have its average temperature of 80° brought to 32° gradually. When speaking of the engineering problem of refrigeration before the Royal Society of Canada last May, I pointed out to the professors in physics at two of our universities that they were not giving the people the benefit of their knowledge.

The situation demands that the scientific and mechanical knowledge required to construct and handle small or large refrigeration plants must be made common: that the people, producers, and consumers be taught its needs and its applications and that a class of students trained to manage large plants be turned out of our universities.

A METHOD FOR THE BACTERIOLOGICAL STANDARDIZATION OF DISINFECTANTS

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The great number of methods, which have from time to time been brought forward as means of comparing the values of disinfectants, have been remarkable for the similarity in their essential points and the variety in their minor details.

These methods may be divided into two classes:

1st. Those in which dried masses of bacteria, or moist solid matter containing bacteria, are immersed in a disinfectant.

2nd. Those in which the bacteria are suspended in a solution of the disinfectant and are individually exposed, *i.e.* the culture is filtered, or in some convenient way the clumps of bacteria are excluded from the test.

The first of these is of value to determine the penetrating power of a disinfectant and only indirectly, its germicidal value. The method known as the Garnet Method of Kronig & Paul (Zeitschrift für Hygiene 1897, 25, p. 1) and that proposed by Kendall & Edwards (Jour. Inf. Diseases, Vol. 8, 1911 page 250) are representatives of this class. The Thread Method (Jour. Royal Sanitary Institute, Feb. 1906, p. 18) is of this character too, but a better opportunity is given in this method for the disinfectant to come into contact with the organisms, because of the action of a liquid in loosening up the fibre of the threads.

Modifications of this general method will not be discussed in this paper.

The second class embraces practically all the other methods proposed, as these, although differing greatly in details, all make use of the general plan to expose the individual bacterium to dilutions of the disinfectant comparing the maximum dilutions of disinfectant and of carbolic acid, which kill the organism in the same time limit. Of the various methods proposed for the valuation of disinfectants that of Rideal and Walker (Jour. Roy. San. Inst., 1903, 24, p. 424) has received most general recognition.

While it is true that no method has been more severely criticized than this, the fact remains that the objections are to the details and not to the principle of the method.

One of the most serious objections in the minds of some is the absence of more than minimal amounts of organic matter. Suggested modifications of the method have been made in which starch, urine, milk, blood and faeces were added to the disinfectant in an attempt to imitate natural conditions during practical disinfection. (Blyth, Jour. Soc. Chem. Ind. 1906). While it is true that organic matter is always present when prac-

tical disinfection is to be carried out, the values of disinfectants of one class, as for example emulsified products derived from coal tar, are all affected by the introduction of organic matter. Their comparative values can therefore be determined almost as accurately without as with this addition.

The time at which disinfection must be accomplished has been fixed by some and only the dilution strength varied (Sternberg). In another method (Chick, Journal of Hygiene 1908) the velocity of disinfection has been determined, all the factors, time, temperature, dilution of disinfectant, etc., being considered in obtaining the constant. In this method complete disinfection is not necessary, the decrease in number of surviving bacteria being sufficient data on which to base the value of the disinfectant.

The organism recommended by Rideal & Walker for use in standardizing disinfectants, namely *B. typhosus*, has been objected to because of the danger to the operator and also because a contaminated subculture cannot be detected except by a microscopical examination.

The London Lancet appointed a Commission to make an independent investigation of the problem of standardizing disinfectants. The bacteriological part of this inquiry was intrusted chiefly to Dr. G. Sims Woodhead, the results of their investigation being published in the Lancet Nov. 13, 20 and 27, 1909, covering both the chemical and bacteriological sides of the question.

This Commission decided that the Rideal-Walker Method will give accurate results if proper attention is given to all the details and the tests carried out by one who is in constant practice in such work. However because of their many failures with the method they suggested a number of modifications chief of which were the test organism, the medium, the amount taken for subculture and finally the method of determining the coefficient.

B. coli communis was chosen as the test organism, the subcultures being grown on McConkey's bile salts medium. This was done chiefly because the organism is non-pathogenic and will give a characteristic growth on McConkey's medium of which 10 c.c. is used.

The amount used for planting subcultures is about three times the usual loopful, being taken with a platinum spoon holding 0.08 c.c. The same measure is used for seeding the disinfectant tubes. The latter are of special construction being $2\frac{1}{2}$ inches high by $\frac{7}{8}$ inch in diameter and are to be kept, during a test, in a water bath of constant temperature, namely 20° C.

"The coefficient was deduced as follows. The figure representing the percentage strength of the weakest dilution of the carbolic acid control was divided by the figure representing the percentage strength of the weakest lethal dilution of the disinfectant being tested. This was done

at the 2½ minutes line and at 30 minutes line and a mean of the resulting figures was taken as the carbolic acid coefficient."

One other method, namely, that of the Hygienic Laboratory proposed by Anderson and McClintic (Jour. of Inf. Diseases Jan. 1911) will be noted here. The modifications suggested are chiefly the return to the organism employed by Rideal and Walker namely, a culture of *B. typhosus* of which 0.1 c.c. is used, the culture medium adopted by the American Public Health Association for water analysis of which 10 c.c. is to be accurately measured into test tubes, a 4 mm platinum loop for making subcultures as originally suggested by Rideal and Walker, and an elaborate form for making dilutions of the disinfectant. Their conclusions are drawn in the way suggested by the Lancet Commission.

One statement made by these authors is significant, "Lack of attention to the different factors concerned in the examination of disinfectants is responsible for a large percentage of the inconsistencies or discrepancies in results obtained by the same or different workers when working with the same disinfectant. Unless strict attention is paid to the various influences involved it is useless to expect to find any method satisfactory."

This statement coupled with that of the Lancet Commission that "To obtain accurate results great care and attention to detail and constant practice are necessary" seems to indicate that not so much importance attaches to the method as to the carefullness with which it is followed and constant practice with it.

Without going further into the various modifications it is the object of this paper to describe a method, which for 12 years has been in use in the Laboratory of Parke, Davis & Company as a means of standardizing disinfectants and especially those derived from coal tar. It, therefore, antedates all the recently exploited methods, although it has never before been published in detail. It was referred to only in the most casual way in a paper "A Contribution to our Knowledge of Insecticides," (McClintock, Houghton and Hamilton) read before the International Congress of Zoölogists at Boston, Mass., in August, 1907. The paper was in part a comparison of the toxic, germicidal and insecticidal properties of a number of substances well known for one or more of these properties. It contained a description of the methods used in testing the value of these substances, the following being the short description of the method for determining their germicidal values, or the carbolic acid coefficients.

"A 24 hour growth of the *B. pyocyaneous* in bouillon culture medium, is filtered to break up or exclude clumps of bacteria difficult of penetration. Six drops of this culture containing millions of bacteria are mixed with 5 c.c. of a dilution of the germicide. After one minute's contact with this a subculture is made by removing a loopful of the solution, which, if properly mixed, will contain a proportional number of the bacteria orig-

inally introduced. This loopful is planted in a tube containing 5 or 6 c.c. of sterile bouillon which is then placed in the incubator for 24 to 72 hours, during which time any organism not destroyed will have multiplied sufficiently to be readily recognized. Subcultures are made in a similar manner after 2, 3, 4 and 5 minutes contact between bacteria and germicide, and changes are made in the dilution of the latter until such a dilution is obtained as will allow growth after two or three minutes' contact, but less than five minutes. The degree of dilution which will give this result for each preparation can be used in comparison with that dilution of carbolic acid which is equally efficient to obtain what is known as the carbolic acid coefficient—a very satisfactory method of readily showing the relative values of different germicides under the same conditions. But the widely differing conditions under which germicides must be used, makes any table of comparisons of only limited value." (Copies supplied on request.)

The method of testing disinfectants herein described in detail was never given any name since its authorship belongs to no individual. It is an adaptation of a method originally used at the University of Michigan, but it has been amplified and changed in its minor details until very little of the original remains, except the general fact of exposing the individual bacterium to the action of the diluted disinfectant and, therefore, belongs in Class II as classified in this paper.

Only one change of importance has been made since this was published, namely to substitute *B. typhosus* for *B. pyocyaneous* as the test organism. This change was made mainly to have the carbolic acid coefficient more nearly in accord with that of other methods, since *B. typhosus* is more generally used than any other organism, while *B. pyocyaneous* was used in no other published method.

The details of this method as now employed will be considered under the following heads:

I. The culture of the test organism.
II. The culture medium.
III. Dilutions of sample and of standard.
IV. Proportion of culture to disinfectant.
V. Time of contact between organisms and disinfectant.
VI. Conclusions.

I. The organism used is a vigorous culture of B. typhosus grown for 24 hours in standard bouillon culture medium at 38° C. It is taken from the incubator at least one-half hour before using, to allow gradual adjustment to changed conditions of temperature before exposure to the germicide. The culture and germicidal agent should always be at the same temperature before interaction takes place. The culture is filtered before use.

To determine accurately the germicidal strength of a germicide upon bacteria, filtration is absolutely necessary, as some bacteria may form scum on the surface of the bouillon or some may clump together in the medium during multiplication. If a mass of bacteria is exposed to a germicide, the superficial layer will be exposed instantly, but those germs in the inner portion of the mass will be protected by the outer layers and the action of the germicide upon them will either be completely prevented or retarded. Especially may this be the case when a germicide which coagulates albumen is used. No matter how great the germicidal power of a germicide, it cannot be expected to kill bacteria unless it is brought into direct contact with each individual cell, as a single cell of the mass, if not exposed and killed when all the other cells are destroyed will multiply into thousands under favorable conditions; consequently the following procedure is carried out before testing:—The 24-hour bouillon culture is removed from the incubator and kept at room temperature without agitation for about half an hour. Then, without shaking the culture, as is usually done, it is decanted into a specially constructed cotton filter, thus leaving scum and large clumps on the filter and filtering the individual bacteria in a practically isolated state. It is then filtered into a sterile test tube, which is subsequently shaken in order to obtain a homogeneous filtrate and make it ready for use.

The cotton filter for the filtration of bacterial cells is an ordinary test tube drawn out at one end like a centrifugal tube, the small end cut open and the edges smoothed with a flame. Into the large end a small pledget of good quality ordinary cotton is introduced as far as the constricted portion of the tube, pushed gently with the forceps, taking care not to form any fissure in the cotton or to leave any spaces between the cotton and tube. The open end of the tube is then plugged with cotton and the whole wrapped in cotton and parchment paper and sterilized by dry heat as usual. Before using the cotton filter after sterilization, the cotton in the tube should be gently pushed back to the proper place by means of a sterile pipette, so that it is in exactly the same position as before sterilization. During sterilization the cotton is pushed up by the tension caused by the heat and its own elasticity, producing an undesirable space between the cotton and the constricted part of the tube.

II. Culture Medium.

500 gm. chopped beef.
20 " Peptone (Witte)
5 " Sodium Chloride
1000 c.c. Water.

The beef is digested at 50° C 1–2 hour, then boiled, strained, the other ingredients added, then boiled again, filtered and adjusted to +1 reaction.

The efficiency of a disinfectant depends on the number resistance and the strain of the test organism. This in turn depends on the character and uniformity of the nutrient medium. Without going into particulars regarding the effect of changes in these various factors it may be said that uniformity in the nature of the bouillon, the degree of alkalinity and amount of peptone and sodium chloride is absolutely necessary in the growing of the test organism in order to obtain uniform results.

III. The dilutions of sample and standard are made either by weight or volume, depending on the character of the disinfectant to be tested. In the case of liquids such as the coal tar disinfectants, both sample and standard should be diluted by volume.

The Sample. Dilutions of an emulsive coal tar product should be made by adding water gradually to the measured quantity of disinfectant. The reason for this is that in some cases the character of the emulsion is greatly altered by the method of making the dilution.

An emulsion is less likely to break if it is made as follows:—To make a 1 per cent. solution moisten the measuring flask or cylinder with about 2 c.c. water. With a capacity 1 c.c. pipette measure the disinfectant and mix it with the water, using this mixture for a partial cleaning of the pipette. Then add more water, stirring just enough to mix but not to make the mixture foam. Wash out the pipette by drawing up and expelling the dilution, then make up to the mark.

This method requires more care in measuring the final dilution if the meniscus is obscured by the emulsion. If the last addition of water is made by carefully running it down the side of the container, the surface liquid will not greatly obscure the reading.

This 1 per cent. solution is further diluted to the desired extent by mixing with distilled water in proper proportion, in each case adding the measured disinfectant to the measured quantity of water to make the desired dilution.

The Standard. Merck's Pure Phenol, is diluted by volume by weighing out any desired quantity, dividing by the specific gravity, 1.08, and dissolving in distilled water, diluting to 20 times the volume of the carbolic acid used, to make a 5 per cent. solution by volume in volume. Further dilutions can be made from this as desired, since the solution is practically permanent.

The dilutions of Carbolic Acid ordinarily used with the results to be expected are as follows:—

	Minutes				
Dilutions.	1	2	3	4	5
1–110	+	−	−	−	−
1–120	+	+	+	−	−
1–130	+	+	+	+	−

The sample is usually diluted in such a way that not more than a half unit in the coefficient lies between two dilutions. For example

1–480 1–540 1–600 1–660 1–720

the intention being to compare with the carbolic acid dilution 1–120. A disinfectant value based on growth at one minute only would be far from exact. Much more accurate results can be obtained where the dilutions compared are those which kill the organism in from 3 to 5 minutes.

IV. The proper mixture of culture and disinfectant is carried out as follows:—5 drops of bacterial filtrate are introduced into 5 c.c. of germicidal solution, contained in test tubes $5\frac{1}{2}$ inches long by $\frac{5}{8}$ inch in diameter. This is added drop by drop in rapid succession, by means of a sterile pipette, $8\frac{1}{2}$ inches long and 0.219 inches in diameter, the narrow end measuring about 0.075 inches in diameter, held vertically at the mouth of the test tube containing the germicidal solution, so that the pipette with the germs will not come into direct contact with any part of the test tube containing the germicidal solution. If any of the organisms adhere to the sides or to threads of cotton in the mouth of the tube they might be inoculated into the bouillon without being exposed to the germicide. As soon as the last one of the five drops is added to the germicidal solution, they are mixed thoroughly for 15 seconds or longer by holding the test tube in the left hand and shaking it with the fingers of the right hand, a formation of air bubbles shaped like a long funnel extending from the bottom of the tube toward the surface of the liquid shows that the mixing is efficiently done, thus bringing every bacterial cell into direct contact with the germicidal solution.

V. The subcultures are taken each minute for 5 minutes by means of a 23 platinum wire loop of 4 mm. inside diameter.

Tests of two dilutions can be carried on at the same time by one person as a half-minute is more than is ordinarily necessary for taking out a subculture and planting into the tube of culture medium. Tests of five dilutions of a sample and three of the standard can therefore be made in about 25 minutes.

To obtain a loopful of the mixture, the test tube should be tilted so as to prevent getting the foam formed on the surface of the mixture during shaking instead of getting a liquid portion of the mixture. The wire loop should be plunged almost to the bottom of the tube before withdrawing.

These loopsful are inoculated into test tubes containing about 6 c.c. of the standard culture medium above described. They are placed in the incubator at 38°C. for 48 hours or for such a time as it is found that no further development of bacteria takes place.

VI. Conclusion as to the value of a disinfectant from a test conducted as described, are drawn by comparing the dilutions of the sample and the standard, which are equally efficient. While in general one dilution of

each is used for comparison, it is often necessary to take the mean of a number, since it is not uncommon for two dilutions to give practically identical results. Note, for example, such results as these:—

Carbolic Acid	1–120	+	+	−	−	−
	1–130	+	+	+	−	−
Sample	1–720	+	+	−	−	−
	1–780	+	+	−	−	−
	1–840	+	+	+	+	−

In this case if no other dilutions of the sample are tested the value is determined by comparing both 720 and 780 with carbolic acid diluted 120 and the result is 6.25 the average of the two values.

It will be noted that in the foregoing description no mention is made of the temperature at which the test is made. While temperature affects very vitally the process of disinfection, the changes in temperature of an ordinary working room rarely exceeds 10°C, while the average change would not exceed 5°C, the year around; and since the standard is affected to practically the same degree by these changes it seems an unnecessary complication to carry out the test at a rigidly defined temperature.

It will also be noted that the time of contact between organism and disinfectant is only one-third as long as is recommended in most tests. While it may form, in some cases a better picture of the value of a disinfectant to find its efficiencies at two periods such as $2\frac{1}{2}$ minutes and 15 minutes, practically no material change in its value results from such a course. The taking of a subculture each minute rather than at $2\frac{1}{2}$ minute intervals makes for greater accuracy, but this does not materially affect the results.

No two investigators are likely to find exactly the same value for a disinfectant even by the same method, if there are many points which may be interpreted differently. It is, therefore, very essential that there be a simple, standard method worked out in all its details, which shall be followed rigidly. The comments made above on some of these minor details is merely to point out how small some of them really are, as bearing on the general problem, while commented upon by their proposer as being of vital importance.

It is to be hoped that the Committee of the American Public Health Association on Standard Methods for the Examination of Disinfectants will in the near future publish a practical method, which will be adopted as official for the United States.

From the Research Laboratory of Parke, Davis & Co., Detroit, Michigan.

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TYPHOID FEVER IN NEW YORK CITY TOGETHER WITH A DISCUSSION OF THE METHODS FOUND SERVICEABLE IN STUDYING ITS OCCURRENCE.

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SCOPE OF THE PRESENT STUDY.

The following résumé is designed to show the methods found especially useful in studying the occurrence of typhoid fever. It is based largely on the writer's experience in the Department of Health in investigating and tracing, during the past seven years, the cause of typhoid fever outbreaks in New York City.

It may at once be stated that in a large city like New York, it is practically impossible to trace the source of infection in a large number of unconnected cases. As soon, however, as a series of connected cases occurs the possibility of discovering such source becomes usually only a matter of methods and proper facilities. The first point of importance, therefore, is the recognition of such connected cases. How is this to be accomplished?

NOTIFICATION.

The foundation of all such epidemiological studies is the prompt notification of all cases by the attending physicians to the public health authorities. While such notification of typhoid fever is required by law almost everywhere, it is notorious that in many instances only a small proportion of the cases actually occurring are reported to the authorities. This is especially apt to be the case where a more or less rigid quarantine is established and where the premises are placarded. It has always appeared to the writer that such rigid quarantines are not only unnecessary but that because of the reason just mentioned, they do more harm than good. The same is usually true of placarding, though at times this prodecure is necessary. If the family in whose house typhoid fever occurs could feel that notification would work no unnecessary or unreasonable hardships, we should soon find less opposition to the prompt notification of the disease to the health authorities.

It is possible, moreover, to encourage prompt notification, especially of typhoid fever, by providing facilities for the examination, without cost,

of blood for the Gruber-Widal reaction, and of urine for Ehrlich's diazo reaction. A condition always made in reporting on such examinations is that the specimen bear the name and address of the patient. The efficiency of free blood examinations in securing notification of typhoid fever is well illustrated by the following figures which show the number of cases of typhoid fever reported in the various boroughs in New York City in 1907.

	Manhattan.	Bronx.	Brooklyn.	Queens.	Richmond.	Total in City.
Total cases reported	2,094	349	1,232,	160	145	3,980
Not typhoid	150	17	37	10	2	306
Blood examined	1,576	262	815	87	117	2,857
Widal positive	1,381	199	656	71	98	2,405

From this we see that about two-thirds of the cases reported to the public health authorities were reported indirectly by means of the blood tests. So far as New York City is concerned, this does not mean that only one-third cases of the of typhoid fever are directly notified; on the contrary, a great many of the cases are reported by physicians both directly (by mail or telephone) and indirectly (by specimens of blood sent to the laboratory). At the same time, many physicians who would hesitate to report cases of typhoid fever directly, or would forget to do so, gladly avail themselves of the aid to diagnosis afforded by blood examinations performed gratis by the health authorities.

DISTRIBUTION OF CASES.

Having then assured ourselves that the cases are fairly completely reported, the next point of importance is their geographical distribution. This can be ascertained by either of two methods. The simpler of these consists in the use of large scale maps of the city, mounted on board; each case being shown by a tack inserted in the location indicated by the address. This was formerly the only method pursued in New York City. It has the disadvantage that it does not lend itself readily to a differentiation of the cases occurring in any given district *according to time*. Thus twelve cases occurring in a given district within a week or two might be of the greatest significance, while the same number occurring within six or eight months might have little or no significance. On a map, however, except as memory helps, or unless many different colors are employed, no track is kept of this time element. For this reason, the writer some time ago introduced the following adjunct to the map record, based, in New York City, on the reported cases arranged by wards. With per-

Cases of Infectious and Contagious Diseases Reported and Deaths from the Same, by Wards.

Boroughs.	Wards.	Sickness.						Deaths Reported.							
		Typhoid Fever.	Small-pox.	Measles.	Scarlet Fever.	Diphtheria and Croup.	Tuberculosis Pulmonalis.	Typhoid Fever.	Small-pox.	Measles.	Scarlet Fever.	Diphtheria and Croup.	Tuberculosis Pulmonalis.	Pneumonia.	Broncho Pneumonia.	All Causes.
The Bronx.	First	..	..	1	..	..	3	..	..	..	..	..	..	1	1	2
	Second	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
	Third	..	..	..	..	..	2	..	..	..	..	..	..	..	..	2
	Fourth	..	..	..	..	..	2	..	..	..	..	..	2	3	2	17
	Fifth	..	..	1	..	..	2	..	..	..	..	..	2	..	..	5
	Sixth	..	..	..	..	..	2	..	..	..	..	..	1	1	1	11
	Seventh	1	..	15	8	11	13	..	..	..	1	..	1	..	..	7
	Eighth	..	..	1	..	3	3	..	..	..	..	1	2	..	2	15
	Ninth	2	..	4	2	6	12	..	..	..	..	1	1	2	2	26
	Tenth	..	..	5	9	..	8	..	..	..	..	1	1	1	2	13
	Eleventh	..	..	5	7	6	22	..	..	..	1	..	5	..	3	23
	Twelfth	2	..	80	79	103	102	1	..	1	..	9	26	17	16	236
	Thirteenth	..	..	9	9	14	3	..	..	..	1	1	3	..	..	10
	Fourteenth	..	..	..	..	1	3	..	..	..	..	..	1	1	1	10
	Fifteenth	..	..	5	..	1	2	1	..	..	..	..	1	..	..	5
	Sixteenth	..	..	..	3	2	7	..	..	..	..	..	3	..	1	20
	Seventeenth	5	..	18	10	17	49	..	..	1	..	2	4	5	6	43
	Eighteenth	1	..	9	1	7	13	..	..	..	..	2	3	3	3	36
	Nineteenth	2	..	34	28	15	50	..	..	1	1	3	17	7	5	122
	Twentieth	..	..	..	4	8	17	..	..	..	..	..	2	4	2	31
	Twenty-first	..	..	8	4	3	17	..	..	..	..	..	3	6	1	32
	Twenty-second	3	..	4	17	13	38	..	..	..	1	2	6	4	8	80
	Twenty-third	..	..	13	36	17	28	..	..	1	..	1	29	4	3	84
	Twenty-fourth	1	..	6	27	13	17	..	..	..	..	..	12	6	3	56
	Total	18	..	218	245	241	416	2	..	5	4	23	125	65	62	886
Brooklyn.	First	..	..	5	1	..	2	..	..	..	..	..	3	3	..	12
	Second	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
	Third	..	..	..	2	2	2	..	..	..	..	..	1	..	..	4
	Fourth	..	..	1	..	..	2	..	..	..	..	..	4	..	..	7
	Fifth	..	..	..	13	1	5	..	..	1	..	..	1	1	..	7
	Sixth	..	..	3	2	2	4	..	..	..	..	1	1	1	..	10
	Seventh	..	..	6	2	4	2	1	..	1	..	..	1	1	2	18
	Eighth	2	..	6	10	10	8	1	..	..	2	1	9	2	1	34
	Ninth	..	..	3	4	5	6	..	..	..	..	..	..	..	..	11
	Tenth	..	..	..	3	4	5	..	..	..	1	1	3	1	1	19
	Eleventh	..	..	1	..	2	1	..	..	..	..	1	4	1	..	12
	Twelfth	..	..	7	2	..	6	..	..	..	..	..	..	2	2	10
	Thirteenth	1	..	5	5	4	3	..	..	..	..	..	..	..	..	4
	Fourteenth	..	..	1	2	1	2	..	..	..	1	..	2	1	..	10
	Fifteenth	..	..	..	2	1	2	..	..	..	..	..	2	1	1	10
	Sixteenth	..	..	..	25	9	7	..	..	..	1	1	2	1	1	17
	Seventeenth	..	..	..	8	7	7	..	..	..	..	..	2	2	3	25
	Eighteenth	1	..	4	14	4	6	1	..	..	1	..	2	1	1	15
	Nineteenth	1	..	6	7	4	1	..	..	..	..	..	..	..	1	11
	Twentieth	..	..	1	..	2	8	..	..	..	..	1	..	1	1	8
	Twenty-first	..	..	2	6	8	2	..	..	..	..	..	1	1	3	22
	Twenty-second	1	..	8	11	3	5	..	..	..	..	..	1	4	2	30
	Twenty-third	..	..	3	7	5	1	..	..	..	..	1	2	1	..	26
	Twenty-fourth	..	..	4	12	6	6	..	..	..	..	..	1	..	3	9
	Twenty-fifth	..	..	5	6	4	5	..	..	..	1	1	2	3	2	20
	Twenty-sixth	..	..	11	49	36	39	..	..	..	..	1	3	4	3	32
	Twenty-seventh	..	..	2	5	8	9	..	..	..	..	..	2	2	..	11
	Twenty-eighth	..	..	..	3	7	1	..	..	..	1	..	3	..	..	27
	Twenty-ninth	..	..	11	2	6	7	..	..	..	1	..	2	2	2	25
	Thirtieth	..	..	42	7	..	4	..	..	..	..	..	1	1	1	16
	Thirty-first	..	..	8	3	2	..	..	..	..	..	..	1	..	..	3
	Thirty-second	..	..	1	1	1	..	..	..	..	..	..	..	1	1	6
	Total	6	..	148	215	148	163	3	..	2	9	9	56	38	31	471
Queens.	First	1	..	..	4	1	3	..	..	..	..	..	..	2	3	21
	Second	1	..	1	11	6	5	..	..	..	..	..	5	3	1	32
	Third	..	..	..	2	..	..	..	..	..	..	..	1	..	..	7
	Fourth	..	..	31	10	3	4	..	..	..	..	..	..	1	1	13
	Fifth	..	..	..	2	..	1	..	..	..	..	..	..	1	..	4
	Total	2	..	32	29	10	13	..	..	..	..	..	6	7	5	77
Richmond.	First	..	..	7	5	3	2	..	..	..	..	..	1	..	2	7
	Second	..	..	2	..	4	..	..	..	..	..	..	..	1	..	4
	Third	..	..	..	..	..	1	..	..	..	..	..	1	2	..	8
	Fourth	..	..	1	..	..	3	..	..	..	..	..	1	..	..	5
	Fifth	..	..	..	..	..	1	..	..	..	..	..	..	1	1	3
	Total	..	..	10	5	7	7	..	..	..	..	..	3	4	3	27

haps some rearrangement of the records, the system is applicable to any other large city.

In the weekly bulletin published by the Department of Health of the City of New York, all cases of infectious diseases reported are arranged by wards. The arrangement of this report is shown in the accompanying reproduction on the preceding page.

By tabulating the returns separately for each ward for a number of years, it is possible to arrive at an average for that ward week by week throughout the year. In the construction of such a table, it is important that any unusual epidemic occurrence of the disease be left out of the calculation; the object of such a table being to establish what, under the present conditions and in the present state of sanitary science, may be regarded as "normal" for that ward without exciting undue suspicion. The writer speaks of such a table as a "normalized average" or "average normal incidence."

The following figures show the construction of the tables here described:

22nd Ward

Week	1906	1907	1908	1909	1910	Normalized Average	Week	1906	1907	1908	1909	1910	Normalized Average
1 January	0	3	0	4	3	2	27 July	3	3	0	2	5	3
2 "	1	3	4	3	1	3	28 "	2	1	2	0	2	2
3 "	1	3	0	2	2	2	29 "	3	4	3	8	6	5
4 "	4	4	1	2	4	3	30 "	11	6	3	15	[15]	7
5 February	0	3	1	3	2	2	31 "	8	4	3	0	14	4
6 "	1	6	1	2	2	2	32 August	13	6	5	3	5	7
7 "	5	3	0	2	4	3	33 "	6	8	6	1	10	5
8 "	2	1	3	0	1	1	34 "	9	11	3	5	5	7
9 March	1	2	2	0	1	1	35 "	3	7	3	9	12	6
10 "	0	[7]	1	0	0	1	36 September	13	8	7	7	11	9
11 "	1	11	1	0	1	1	37 "	12	6	6	[19]	15	8
12 "	0	10	0	0	2	0	38 "	8	7	4	[20]	6	7
13 "	0	18	0	0	3	1	39 "	14	5	3	[28]	7	7
14 April	1	8	3	0	1	1	40 October	13	9	4	10	14	9
15 "	2	5	1	0	0	1	41 "	8	12	8	5	9	8
16 "	0	6	3	1	2	1	42 "	8	16	3	3	10	8
17 "	1	3	2	1	2	1	43 "	10	9	4	3	5	7
18 May	1	10	1	0	1	1	44 "	2	10	4	5	9	5
19 "	1	5	2	2	3	2	45 November	6	8	3	3	13	5
20 "	1	[5]	1	0	1	1	46 "	2	7	4	4	[14]	4
21 "	3	2	2	2	0	2	47 "	17	5	3	3	6	5
22 "	0	1	2	1	5	2	48 "	9	2	2	5	4	4
23 June	0	5	2	5	3	3	49 December	3	3	2	7	3	4
24 "	2	4	4	2	3	3	50 "	3	0	6	2	1	3
25 "	1	4	3	1	1	2	51 "	3	4	2	2	7	3
26 "	2	4	3	2	3	3	52 "	3	1	1	0	0	2

The figures enclosed in a frame are omitted in calculating the "normalized average."

Manhattan—Previous Years

	1906	1907	1908	1909	1910	1911	Normalized Average
January	17	17	13	27	23	18	20
February	23	19	13	18	11	22	16
March	16	43	10	15	39	11	14
April	16	29	16	0	15	18	12
May	6	38	10	16	12	10	11
June	14	79	18	15	15	12	15
July	14	106	12	10	14	14	12
August	11	80	9	7	17	9	11
September	14	54	13	10	9	12	11
October	15	72	10	7	17	13	17
November	24	72	10	7	17	13	17
December	16	66	10	5	11	11	10
	17	56	17	11	14	18	12
	9	56	15	8	15	21	12
	14	35	17	15	13	14	15
	9	41	12	12	22	18	14
	18	22	11	13	14	17	14
	13	17	15	7	22	6	15
	4	29	11	22	26	20	18
	21	21	16	19	25	44	18
	15	38	19	12	11	37	19
	17	32	27	19	19	35	22
	15	23	11	20	19	24	16
	27	27	35	6	21	47	23
	28	29	21	29	28	53	27
	47	45	29	28	62	80	37
	41	44	28	14	60	82	32
	45	42	57	32	53	86	44
	56	48	72	20	54	88	49
	66	75	61	46	61	61	62
	45	53	81	78	104	67	62
	81	64	75	99	107	59	73
	85	96	77	91	91	56	86
	74	92	94	147	61	86	87
	67	86	70	120	76	75	74
	71	82	46	69	85	56	67
	60	87	49	45	87	40	60
	70	56	52	30	49	62	51
	61	56	44	35	50	63	49
	49	49	42	40	35	55	42
	69	42	24	32	86	53	42
	50	41	49	36	72	54	42
	58	30	35	35	32	48	33
	43	23	22	22	17	42	25
	34	22	33	43	24	46	31
	30	21	21	14	32	38	23
	30	26	30	10	22	29	24
	20	16	21	4	21	30	16

Manhattan—Typhoid Fever By Wards 1911

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
January	0.2	....	....	....	....	0.4	2 0.4	0.4	0.8	....	0.4	5 8.0	1	0.2	1	....	1 0.6	1 0.4	3 4.0	1.2	1 0.6	3 2.0
"	0.6	....	....	....	....	0.4	1.0	0.2	1 0.6	0.6	0.4	6 9.0	1 0.2	....	0.4	1 0.8	1 0.6	0.6	2 3.0	1 1.2	2 0.6	5 2.4
"	0.1	....	....	....	....	....	0.4	0.4	0.4	0.2	0.8	4.0	1	....	....	1 0.2	1 0.4	0.2	3 2.4	1 1.0	1.0	1 1.6
"	0.1	....	....	....	0.2	....	1	0.2	2 0.2	....	0.8	2 5.0	0 2	0.4	0.4	0.2	5 0.4	1 0.6	2 2.0	0.8	1 1.0	3 3.0
February	....	0.2	....	....	....	2 0.8	0.4	....	1	0.4	9 5.0	0.5	....	2	....	....	....	1 0.8	5 4.0	1 0.8	1.2	1 1.8
"	....	....	....	0.2	....	0.4	1 0.4	0.4	0.6	1 0.4	2 0.2	1 5.0	....	0.4	0.2	1.2	1 0.4	0.6	2 2.0	1 0.6	0.6	2 1.5
"	0.1	....	....	....	0.6	0.2	1.0	1 0.2	0.2	0.6	0.2	3 4.0	0.4	0.2	....	1.1	2 0.5	0.8	1 4.0	1.4	0.6	3 2.8
"	....	....	0.2	....	0.4	....	0.2	0.4	1 0.4	0.4	0.8	3 5.0	0.4	0.4	....	0.8	0.4	0.6	2.0	1.4	1.2	1 1.5
March	....	....	....	....	....	2 0.4	....	2	0.6	0.4	5 6.0	0.4	0.2	1 0.6	....	0.4	3 0.2	....	4 2.4	1.6	....	1 1.0
"	0.4	....	....	0.2	0.2	....	0.8	....	1 0.4	0.4	2 0.4	4 3.0	....	....	....	0.2	1.2	0.4	2 1.6	0.8	1.0	1 0.3
"	0.2	....	....	....	....	....	1 0.6	0.6	0.6	0.2	....	7 5.0	0.2	1 0.2	....	0.4	0.4	0.8	3.0	0.8	1.3	3 0.8
"	....	....	....	0.2	0.2	....	0.6	....	2	0.4	0.6	7 3.5	....	1 0.6	0.6	0.4	0.8	0.6	1.6	1 0.4	1 1.8	2 0.5
"	0.2	....	....	0.2	0.2	....	1 0.2	0.6	1.0	....	0.6	3 5.0	0.6	0.2	0.4	1 1.0	1 0.4	0.2	1 1.0	1.0	1.0	2 0.8
April	0.4	....	....	....	....	0.2	0.6	0.2	0.4	1 0.2	1	4 4.0	0.6	....	....	0.2	0.6	1 1.4	0.2	1 0.5	1 0.6	2 0.3	1 1.3
"	0.2	....	....	....	0.4	....	1.2	0.2	....	0.2	0.4	3 4.0	....	....	....	0.2	0.8	1 0.4	1 0.8	3 2.3	1.0	2 1.5	3 0.8
"	0.4	....	....	0.4	0.2	1 0.2	0.5	....	0.2	0.2	0.6	3 2.5	....	0.4	1 0.2	0.2	0.8	2 0.6	1 1.3	2 0.6	0.3	1 1.5
"	....	....	....	0.2	....	2 0.3	0.4	0.4	1 0.4	1 0.6	8 3.0	0.4	0.6	1.0	0.6	1.2	3 0.2	....	0.8	1 0.6	2 0.3	1 1.5
May	1 0.2	....	....	....	0.2	1	0.6	0.2	....	0.8	0.6	9 4.0	....	0.2	....	1 1.0	1 0.6	2 0.2	....	0.3	1 1.2	1 1.0	4 0.8
"	0.4	....	....	....	....	1 0.4	....	....	0.8	0.8	0.4	7 8.0	0.6	....	....	1 0.4	1 0.4	....	2 2.5	1.2	1 0.6	1 2.0
"	0.4	....	....	....	0.2	....	0.5	1	0.6	0.2	1 0.8	5 7.0	0.2	0.4	0.4	0.8	3 0.2	1 0.6	2 1.4	3 1.8	1.2	2 0.8
"	....	....	....	....	0.4	1 0.4	2 0.4	0.2	1	1	3 0.4	4 6.0	0.2	....	....	0.6	0.8	1.8	2 1.8	0.8	1 0.8	2 1.8
June	0.2	....	0.2	....	0.2	0.2	1 0.8	....	1.0	0.6	0.6	2 5.0	0.2	....	....	0.2	0.8	1 0.6	2 0.8	0.8	1.0	1.8
"	....	....	....	0.6	0.2	0.2	0.6	....	3 0.8	0.2	1 0.3	2 7.0	1 0.4	....	0.4	2 0.8	2 0.6	2 C.2	2 1.2	0.6	1.0	5 3.0
"	0.2	....	0.2	0.2	0.2	0.2	2 0.2	....	1 0.6	0.2	1 0.6	9 4.0	0.3	1 0.4	1	....	0.6	2 0.0	11 2.0	1 1.4	1 1.0	14 3.0
"	0.2	....	0.2	0.2	....	0.2	0.6	1 0.2	0.6	0.6	0.8	8 6.0	0.4	1 0.4	0.2	2 0.4	2 0.6	3	5 3.4	4 0.6	1 0.8	10 2.0
"	0.2	....	0.4	0.2	....	0.2	0.2	0.4	1.0	....	1 0.4	7 5.0	0.4	....	0.4	0.4	1.2	0.8	2 2.4	1.0	2 0.6	10 2.6
"	0.4	1	1 0.2	....	0.4	1	1 0.2	0.2	1.4	....	0.2	8 8.0	1 0.2	5 0.2	0.2	1 0.2	1	2.0	6 1.4	1 1.6	1.8	10 2.8
July	0.2	....	....	0.2	1 0.2	1 0.2	0.2	0.4	1.0	....	1 0.4	7 5.0	0.4	....	0.4	0.4	1.2	0.8	2 2.4	1.0	2 0.6	10 2.6
"	0.4	0.4	1 0.2	....	....	....	1 1.2	0.4	0.6	1 0.8	0.2	15 8.0	0.6	0.4	....	0.6	0.6	4 0.2	5 0.6	3 1.8	2 1.0	15 1.4
"	....	0.2	0.2	1 0.2	....	0.4	1.4	0.2	0.8	0.8	2 0.8	13 6.0	0.6	0.2	....	1.0	0.4	2 0.2	4 4.0	9 1.8	3 0.8	19 4.8
"	0.2	....	1 0.6	....	....	0.4	3 0.6	1 0.4	1.8	1.0	1 1.6	20 12.0	0.4	0.6	2 0.6	5 1.0	2 1.8	1 0.8	6 3.2	5 2.8	1 1.8	32 10.0
August	0.2	....	0.2	0.4	0.2	1	1.4	1 0.2	3 0.8	0.2	2 1.0	18 10.0	1 0.6	1 0.2	1 0.8	4 1.0	1 1.0	1 1.2	13 4.0	4 3.0	1.6	31 5.8
"	....	....	0.2	....	0.2	....	1.6	1 0.8	2 2.5	0.2	2 1.4	26 11.0	1 0.4	1 0.6	0.6	3 0.6	1 1.8	7 1.2	7 5.4	14 2.0	2 1.5	26 6.4
"	0.4	1 0.2	0.6	....	....	0.4	1 2.0	1 1.0	1 1.5	2	1 1.2	22 12.0	1 0.2	0.8	1.2	4 1.6	3 1.6	3 0.4	13 5.0	3 4.0	2 2.0	29 6.2
"	0.4	0.2	2 0.4	0.2	0.8	2	2.4	1.0	2 3.3	2.0	2 1.6	23 17.0	1 0.6	1.0	1 0.6	2 1.8	2 1.8	4 3.0	7 4.0	3 4.4	1 2.3	9 6.6
"	....	0.2	0.6	2 0.6	0.4	3 0.4	2 2.4	1 0.8	1 3.5	0.8	1 3.0	23 24.0	1.2	1.0	0.8	1 1.8	1.8	1 2.2	10 7.5	3.4	7 2.3	15 6.1
September	0.2	0.2	0.2	0.4	....	1.0	2 2.8	....	2 2.8	1 1.2	3 2.4	21 24.0	1 1.6	1 0.8	1.2	2 0.6	1.6	2.6	13 11.5	4 3.2	2 5.0	7 9.2
"	0.8	0.2	....	0.2	0.6	0.2	1 3.6	0.4	1 0.8	2 0.8	1 2.0	32 29.0	1 2.6	0.6	0.8	1 1.2	2 3.8	1 2.6	4 10.5	1 4.0	1 4.8	9 9.8
"	2 0.8	....	0.4	0.2	2 0.6	....	4 0.5	1 0.8	1 2.3	1.0	1 3.1	38 31.0	1.8	1 0.4	1 0.8	2 1.0	1 4.4	2 3.8	15 10.0	3 3.4	1 3.0	11 6.3
"	0.4	....	0.4	3 0.2	1 0.2	0.8	2 3.0	2 0.6	6 2.0	2.1	4 2.4	24 27.0	1 1.3	0.6	0.6	4 1.4	2 4.6	3 3.4	6 8.5	4 3.2	2 3.5	11 7.3
October	0.2	0.2	....	0.4	0.6	1 0.4	1 2.6	1 1.2	5 1.8	1.6	1.2	16 22.0	2 0.8	0.6	1 1.0	1 1.4	4 2.8	2 2.0	6 9.0	7 3.8	3 2.3	6 10.0
"	0.8	0.2	0.3	0.2	0.6	0.4	2 0.8	1 1.0	3 2.8	1 0.8	2 3.0	13 19.0	1 1.8	0.4	0.8	1 0.8	1 2.0	1 2.5	6 11.5	1 3.8	1.5	7 8.4
"	0.8	....	....	1	0.2	0.2	2 1.2	1 0.6	4 2.2	1 0.8	4.0	22 18.0	0.8	0.2	1.3	1.8	3 1.8	3 3.0	9 5.0	5 3.0	2.5	11 6.0
"	0.6	....	....	....	....	....	1 2.0	0.8	6 2.0	1.2	1 1.4	21 15.0	1.2	0.6	1 1.6	1 1.4	2 1.4	2 1.8	9 7.0	3 1.6	1 4.0	12 6.2
November	0.2	....	0.2	....	....	0.2	3 1.8	0.6	2 2.0	2 1.2	4 1.4	20 14.0	2 0.8	0.6	2 1.0	1 1.6	2.0	1 1.4	3 5.4	1 2.0	3 3.0	9 6.0
"	....	....	....	2 0.2	....	1	3 3.0	1 0.6	3 0.8	1 1.2	2 1.6	12 15.0	1 0.5	1	1.0	1 2.3	1 3.1	4 2.0	6 2.7	0 3.2	0 2.3	4 1.4	14 5.0
"	1 0.8	....	....	0.6	1 0.4	1	1.8	1 0.4	0.8	2 0.4	7 0.6	16 12.0	5 0.8	1.0	1.2	1 1.2	1 2.2	0.8	6 6.0	5 2.8	1 1.8	6 4.3
"	0.4	....	....	0.2	0.2	0.6	1 1.2	1 0.2	1 1.6	1 0.8	1 1.8	18 11.0	0.4	0.3	0.6	1 0.8	5 1.0	1.0	12 4.0	2 2.6	1 2.0	4 4.3
"	0.2	....	....	0.2	0.2	0.2	1.0	0.2	2 0.6	0.4	1 0.4	17 7.0	0.4	0.6	0.2	0.2	0.4	0.8	6 4.0	3 1.2	2.0	6 4.5
"	....	....	1 0.2	0.2	0.2	1.0	2 1.0	0.2	2 1.0	0.5	1.2	20 8.0	1 0.2	1 0.2	0.6	1 0.8	3 1.0	1 1.0	1 5.0	3 0.8	1 1.8	9 4.5
"	0.2	....	0.2	....	0.4	....	0.8	1	1.4	1 0.4	0.8	12 5.0	1 1.0	0.4	0.8	1 1.0	7 0.2	1.4	5 3.4	1 2.0	1 1.2	8 2.4
"	....	....	....	....	0.4	....	1 0.8	2 0.2	0.2	....	....	12 8.0	1 0.2	0.2	....	0.8	1 0.4	0.2	4 5.6	1 0.6	1 0.2	6 3.6
"	1 0.4	1	....	....	....	....	3 0.6	1 0.4	2 0.8	1 0.2	1 0.4	6 5.5	0.6	1 0.2	1	0.4	1 0.4	1 0.8	2 3.6	2 0.8	1 0.4	5 1.9

In the construction and use of such a table two things should be borne in mind. First, it is important that the geographical districts be neither very large or very small. In the former case, the resulting number of cases reported from that district will be too large to reflect readily any abnormal occurrence of the disease being studied; if too small, the statistics will suffer from embracing too few cases to admit of any fair analyses. In the second place, whatever districts are once laid out should not be changed from year to year, because an important function of these normalized averages is to reflect the normal incidence of the district for a period of years. In case a district becomes too large, owing, for example, to a rapid development of sections previously little built-up, it may be divided, but care must be taken not to disturb the original boundaries. When so divided, it is advisable to have an accurate census made of the several parts, to serve as a guide for the incidence of infections reported.

A similar normalized average is calculated for every ward in each borough, and for each borough as a whole. The method of using such normalized averages is well shown in the following reproduction of the figures showing the cases of typhoid fever reported in the Borough of Manhattan in 1911.

The weekly returns for each ward are inserted in the proper place as soon as available, and any disparity between the recent returns and the normalized average for that week is at once apparent. A glance at the above table shows that in the twenty-second ward the figures rose considerably above the normal in the middle of June; a similar rise was noticed also in several other wards, but not throughout the city. With the following week the condition was accentuated, and at once led to careful studies as to the origin of this increased prevalence of typhoid fever in these wards. A little later we see a marked increase in the returns from the Bronx. (Wards 23 and 24.) It is clear that analysis of the reported cases on this ward basis will yield ever so much more information than an analysis based merely on the returns from an entire borough or from the entire city. An increase in cases sufficient to arrest attention when in the ward returns may be entirely obscured when the returns embrace the figures from an entire borough. The value of these normalized ward averages is, therefore, two-fold: First, the recognition of any undue number of cases of the disease, and Second, the light the ward returns shed on the probable source of the infection. It is obvious that an increased prevalence of typhoid fever in practically all the wards of a city has an entirely different significance than one limited to but one or two wards. Similarly, if only one borough is affected, a factor common to all the boroughs cannot be involved.

It may, however, happen that cases distributed over different parts of the city still have a common origin. This is often true of milk-borne

infections, especially when the milk is distributed by a large wholesale dealer. In order to afford a ready means of recognizing connected cases of this kind, it is necessary to keep a tabulation showing at a glance the number of cases of typhoid fever occurring among the customers of each wholesale milk dealer. This will be gone into again in discussing milk infections. At the present time, I wish merely to call attention to this method of recognizing any unusual prevalence of typhoid fever. The following form of record now used in our work is in the form of a large wall chart:

Dealers	Approximate average daily sales in quarts		Onset during week ending					
	Raw	Past'd	Jan. 6	Jan. 13	Jan. 20	Jan. 27	Feb. 3	Feb. 10
Beakes Dairy Co.								
Borden's C. M. Co.								
Blake-Luke								
Bosch's Sons, John								
Briarcliff Farms								
Bronx M. & C. Co.								
etc.								
X. Co.	7,500	30,000		III	III	III III		
Y. Co.	20,000	3,000		II	III	III	III II	III I

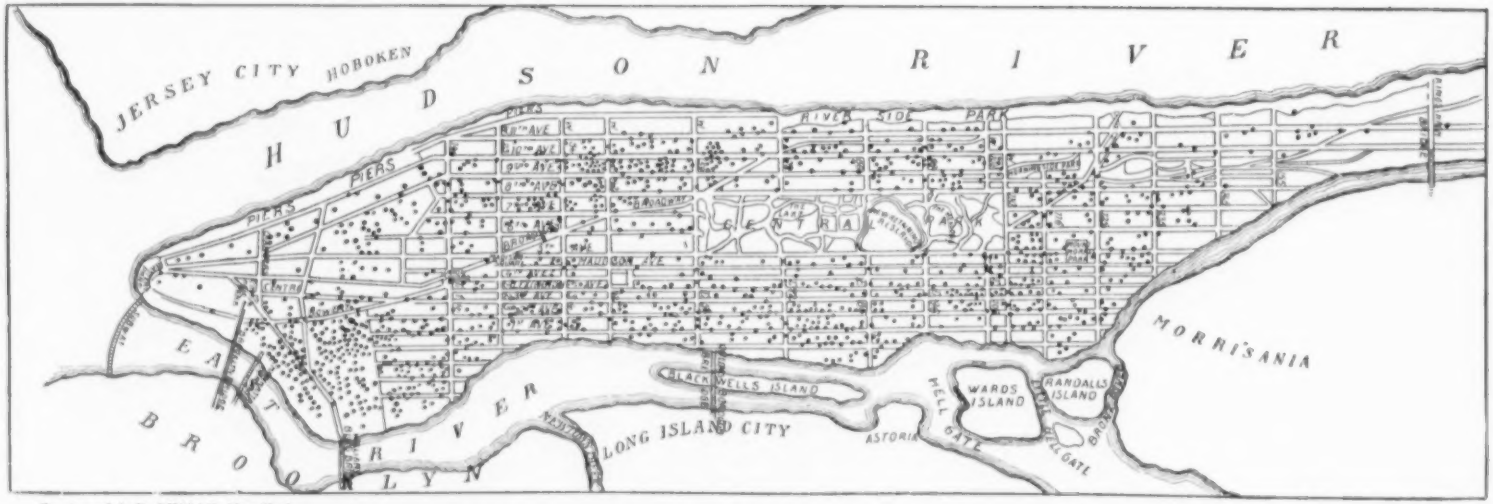
Just as tabulations of cases from an entire borough may often fail to disclose abnormal groupings which readily appear in ward tabulations, so in the case of milk-borne infections, tabulations showing the number of cases occurring among the customers of each nilk dealer sometimes may not suffice to disclose an abnormal incidence occurring with some particular milk dealer. This, of course, is true only with the large milk companies. We have, therefore, devised another form of record to help call

attention to an abnormal incidence of infections, namely, a tabulation of the creameries from which the supply used by a given patient during the three weeks prior to onset was drawn. Such a tabulation is useful only in those cases where the milk from each creamery is sold at retail as it comes from the creamery and is not first mixed in the city with milk from other creameries. The tabulation shown herewith is in the form of a large wall chart so that the information is always in plain sight:

Creamery.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
A. Afton.....5,000 qts.												
Albion.....1,600 qts.												
Alliance.....3,500 qts.												
B. Bennings.....												
Burlington.....												
Brewsters.....												

Recording the cases by means of pins or tacks inserted in large scale maps is often of considerable value in indicating the manner of infection and should constitute one of the routine procedures in keeping track of typhoid fever. In order, however, to obtain the greatest possible advantage from this pin-map method of analyzing the reported cases, it is important to have indicated on the map as nearly as possible the various water supplies, for in most large cities, owing to the incorporation of outlying towns, there are districts having distinct water supplies. For example, the Borough of the Bronx is supplied mainly by water from the Kensico reservoir, which is entirely independent of the Croton water. Considerable portions of the borough, however, receive Croton water. The map here reproduced was prepared for us by the engineers of the Department of Water Supply, and shows shading all the streets supplied with Kensico water. The streets unshaded have Croton water, or no mains of any kind have yet been laid. During the water-borne outbreak of typhoid fever in New York in 1907 the cases were quite uniformly spread throughout the Borough of Manhattan, but in the Bronx were largely limited to the section supplied with Croton water.

The usefulness of such a map in indicating whether or not a given out-



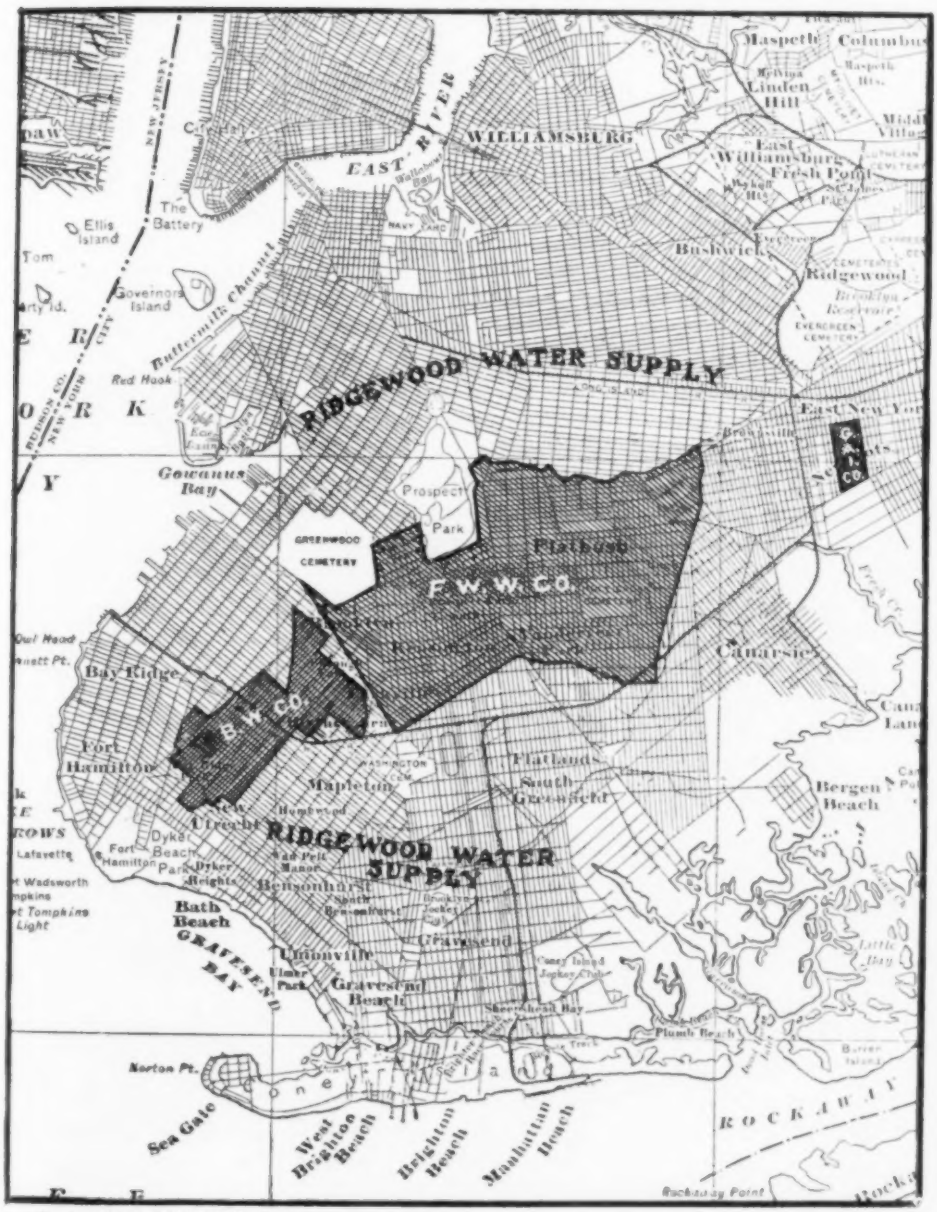
Courtesy of A. R. OHMAN, New York.

Pin Map to Study Geographical Distribution of the Cases.

Note. (In this reproduction, many of the streets have been omitted. The original map is about 8 feet long.)

Courtesy of A. R. OHMAN, New York.

Borough of The Bronx, showing Kensico Water Supply in heavy shading.
The rest of the borough is supplied with Croton water.



Courtesy of A. R. OHMAN, New York.

Borough of Brooklyn, showing the various water supplies.

break of typhoid fever is water-borne can be increased by indicating, with pins or tacks of a particular color, just which cases have been drinking bottled water. Naturally a large proportion of such tacks would cause one to investigate the possibility of infection from this cause. Moreover, it is well, in using the maps, to have a special color tack to indicate cases which could not possibly have become infected in town.

INVESTIGATION OF THE INDIVIDUAL CASES.

In attempting to trace the source of infection it is imperative that complete and accurate data be compiled from individual cases. In smaller communities it may be feasible for a single trained investigator to secure all the necessary data from the patient, his physician, or family; in a large city, however, recourse must be had to blanks to be filled in, either by the attending physician or by medical inspectors. It is surprising to see how much the individuality of the inspector determines the character of the data secured. From my experience I am convinced that it is important to have a small number of well-trained inspectors for this work alone, and not divide the cases among a large number of inspectors doing work along other lines also. (School inspection, other contagious diseases, disinfection.) In the study of the cases occurring in New York, we make use of the following blank prepared by the Division of Communicable Diseases. (See page 352.)

Name, age, marital state, color, nationality, and address are almost wholly desired for purposes of identification of the patient. A study of the age groupings, however, often yields important suggestions regarding the probable causes of infection.

It is very important to know the occupation of the patient, in order to take the necessary steps against a spread of the infection. Taken in connection with the date of onset, a knowledge of the patient's occupation may occasionally serve to explain subsequent cases.

It is important to have the name and address of the physician who reported the case in order to be able, if necessary, to make further inquiries.

The same is true of the heading "Removed to a Hospital."

The importance of a careful analysis of the dates of onset will be discussed subsequently.

The questions concerning the duration of illness, when the case was first seen by a physician, and the data concerning the blood examination are needed in order to enable the one who studies the reports to form an idea as to the correctness of the diagnosis.

It is obvious that only true cases of the disease should be tabulated, hence the inquiry concerning "No case."

The occurrence of relapses, perforations and hemorrhages should be

(Front of Card.)

NAME DATE | CASE No. YEAR. BOROUGH COLOR ON MAP

AGE Years SEX Male—Female MARITAL STATE Single—Married—Widowed COLOR White—Black NATIONALITY OCCUPATION

ADDRESS: STREET NUMBER FLOOR APT. NO. CARE OF

REPORTED BY ADDRESS TELEPHONE HOW: P. B. U. D. T. C. D. L. INSP.

REPORTED LATER BY ADDRESS

REMOVED TO HOSPITAL DATE

CLINICAL REPORT: DATE OF ONSET DURATION OF ILLNESS WHEN FIRST SEEN BY ATTENDING PHYSICIAN —(1 TO 3 DAYS)

(3 TO 7 DAYS) (OVER 7 DAYS) BLOOD EXAMINED FOR WIDAL (YES) (NO) (POSITIVE) (NEGATIVE) (DOUBTFUL)

CONFIRMATORY:—(POSITIVE) (NEGATIVE) (DOUBTFUL) BLOOD CULTURE (YES) (NO) (POSITIVE) (NEGATIVE) DAY OF DISEASE

IF NO CASE STATE CLINICAL DIAGNOSIS

LATER REPORT: RECOVERY (YES) (NO) DEATH, DATE CAUSE

COMPLICATIONS: RELAPSE (YES) (NO) PERFORATION (YES) (NO) HAEMORRHAGE (YES) (NO)

DURATION OF DISEASE (UNDER 2 WEEKS) (2 TO 4 WEEKS) (4 TO 6 WEEKS) (OVER 6 WEEKS)

REMARKS:

ASSIGNED TO RETURNED

ASSIGNED TO RETURNED

3M L—1911 DEPARTMENT OF HEALTH, CITY OF NEW YORK—TYPHOID FEVER 21,667, '11, 1,000 (F.)

(Back of Card.)

INSPECTOR'S SANITARY REPORT

PRIVATE HOUSE, BOARDING HOUSE, HOTEL, APART., TEN., INSTITUTION NO. FAMILIES HOW LONG ON PREMISES?

SANITARY CONDITIONS (GOOD) (FAIR) (BAD) STABLE IN VICINITY? (YES) (NO) ADDRESS COMPLAINT FORW'D

FLIES PRESENT IN CONSIDERABLE NUMBERS? (YES) (NO) PRECAUTIONS TAKEN AGAINST SPREAD OF DISEASE BY FLIES? (YES) (NO)

OTHER CASES IN FAMILY? (YES) (NO) HOUSE? (YES) (NO) AMONG FRIENDS? (YES) (NO) SERVANTS? (YES) (NO)

DETAILS AND DATES

DID PATIENT DRINK MILK HABITUALLY DURING MONTH PREVIOUS TO PRESENT ILLNESS? (YES) (NO)

NAME OF MILK DEALER COMPLAINT FORW'D

ADDRESS OF STORE OR DISTRIBUTING BRANCH

DID PATIENT EAT RAW OYSTERS? (YES) (NO)

NAME OF DEALER (OYSTERS) ADDRESS COMPLAINT FORW'D

WATER SUPPLY DURING MONTH PRECEDING PRESENT ILLNESS: CITY (YES) (NO) TANK (YES) (NO)

PRECAUTIONS (BOILED) (FILTERED) WAS CITY WATER REGULARLY CONSUMED IN LARGE QUANTITIES OR ONLY SPARINGLY?

BOTTLED (YES) (NO) NAME WELL (YES) (NO) ICE (ARTIFICIAL) (NATURAL)

WAS PATIENT OUT OF TOWN EVER PART OF A DAY, AND EXPOSED TO POSSIBLE INFECTION BY WATER OR MILK DURING THE THREE WEEKS PRECEDING PRESENT ILLNESS? (YES) (NO) WHERE? (GIVE DATES FROM AND TO)

ARE ALL PRECAUTIONS BEING TAKEN AGAINST SPREAD OF INFECTION? (YES) (NO) HAS PATIENT SEPARATE ROOM AND BED? (YES) (NO)

ARE STOOLS, URINE, BEDDING, DISHES, ETC., BEING PROPERLY DISINFECTED? (YES) (NO) TRAINED NURSE IN ATTENDANCE (YES) (NO)

WHEN WAS CASE PLACED UNDER TYPHOID PRECAUTIONS? (DATE) WAS SOURCE OF INFORMATION RELIABLE? (YES) (NO)

WHAT, IN THE OPINION OF THE ATTENDING PHYSICIAN, WAS THE SOURCE OF INFECTION? INFECTED WATER, MILK, OYSTERS, DIRECT EXPOSURE TO INFECTION, OUT OF TOWN INFECTION?

PREMISES FUMIGATED BEDDING DISINFECTED

noted not merely because of their statistical value, but also because they aid in the diagnosis.

This applies also to the "Duration of the Diseases," the answer to which question is filled in only when the case has terminated.

The desirability of data concerning the sanitary condition of the house, the number of families living therein, and how long the patient has lived there, are obvious. It sometimes happens that the patient's address is correctly given, but inquiry reveals that he resided there since but a few days before the onset of the disease. It is apparent that the inquiries concerning the patient's surroundings, his milk and water supply, etc., must be made at the previous address. The importance of knowing whether there is a stable in the vicinity of the patient's home comes from our knowledge of fly transmission as is indicated by the next query.

In answering the question concerning other cases in the family, etc., a great deal depends on the ability of the inspector making the investigation. It is important to get the dates and place of onset of each of the other cases, as well as some facts concerning the probable source of their infection. In fact, all the data demanded for the original case should be obtained, if possible, so as to furnish a guide to the person subsequently analyzing the information obtained by the inspectors.

The question concerning milk drinking must be carefully gone into. A great many individuals will deny ever drinking raw milk, and if this is really the case it is practically impossible to include them, except as secondary cases, in a milk-borne outbreak of typhoid fever. As a matter of fact, however, many people often overlook the fact that they take raw milk or cream on cereal in the morning, or with fruit (peaches and cream, berries and cream, etc.).

When the use of uncooked milk is reported in a case which appears in every other particular to belong to a certain group of milk-borne infections, it is well to make a second visit to ascertain the correctness of the data originally obtained. This, of course, applies also to any other seeming exception.

The reason for asking the name of the retail milk dealer and the wholesale dealer is obvious. The method of tabulating and analyzing the data concerning the milk supply will be discussed later.

With a disease so often water-borne as typhoid fever the need of accurate information concerning the water drunk by the patient prior to the onset is apparent. Certain features of water infections will be discussed subsequently.

The data concerning a possible infection through oysters or clams are important, as now and then outbreaks of typhoid fever have been traced to this source, especially in England. At the same time, unless the sale of oysters be controlled along lines similar to those governing the sale of

milk, it will require extended investigations to trace the infection to its original source. Some years ago, a number of persons were apparently thus infected by eating infected oysters at a banquet in this city, and it is under circumstances like this that the discovery of oyster-borne infections may now and then succeed. So far as the extent of oyster-borne typhoid fever in this city is concerned, it may be added that the usual increased incidence of typhoid infections corresponds to the season (June July and August) when oysters are not generally eaten.

RECORDS AND FILES.

Journal, in which the cases are entered seriatim according to the date reported. Each case is given a serial number. The data entered are the name, address, age, date of report, date of onset, together with the dates when the case was assigned to an inspector for investigation, when returned, and remarks.

History Card. This is described elsewhere. The cards are all carefully looked over on their return by the inspector, in order to make certain that all the data have been properly obtained. In fact, it is advisable to enter the data into a large book, case by case, so as to check up the completeness of the inspector's report. The cards are filed according to address.

Milk Card. This has also been described elsewhere. From the card the wholesale dealer's name is noted, and the case charged against the dealer on the large tabulation already described. This card is then sent to the MILK DIVISION, where the milk data are examined. In the case of dipped milk, and where the back of the card shows the creamery tags found by the inspector, these names are entered on the "creamery tabulation." In the case of bottled milk, inquiry is made of the company supplying the milk in question as to just what creameries shipped milk into the affected district. The milk cards are filed under the name of the wholesale dealer.

Milk Dicision Journal. In this each case reported is entered seriatim, and the date of onset, age, retail milk dealer, wholesale dealer, and the various creameries supplying this milk during the three weeks prior to the onset of the disease.

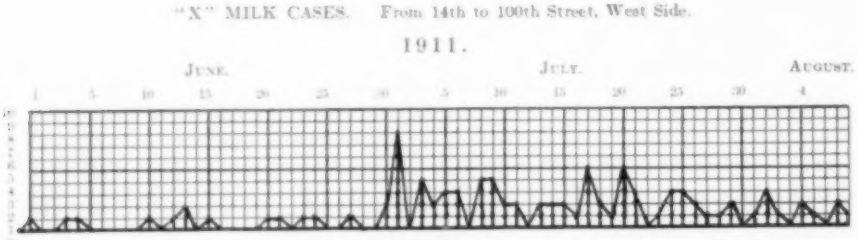
Milk Dealers' Tabulation as well as Creamery Tabulation is made up in this office from the information on the milk cards and from that subsequently obtained from the milk companies.

Widal tests and Diazo tests made in the Diagnosis Laboratory are filed away by means of the slips accompanying the specimens, arranged by address. Cases discovered or confirmed by means of laboratory tests are at once notified to the Record Clerk of the Division of Communicable Diseases for record in the Journal above mentioned.

These constitute the Basic Records from which the studies outlined in the following are made.

THE STUDY OF THE DATA OBTAINED.

For the purposes of orientation it is well to make several preliminary tabulations. For obvious reasons it is important to sift out as many of the cases not connected with the outbreak as possible. Hence it is wise in localized outbreaks in a city, to study merely the cases within a given district. In New York City, it is often necessary to analyze merely the cases occurring in one ward to obtain the correct clue. If the abnormal increase in the number of cases appears to be confined to the users of one particular milk supply, it is important to study these cases separately. The next point to inquire into and to tabulate is the date of onset of the individual cases. It is sometimes advantageous to combine this tabulation with the address of the patients. Now and then it happens that this discloses a group of cases located within but a short distance of each



other infected at the same time, followed by other groups with later onsets. When there is a marked increase in typhoid fever in several wards in the city, it is of the greatest importance to make comparisons of the dates of onset in these various groups. This will occasionally bring to light unexpected connections between the various cases.

The tabulation of the dates of onset may show whether infection occurred but once or repeatedly. If the former is the case we shall have the majority of cases with onsets all within several days of each other; the rest of the cases are scattered both before and after that period. The period during which cases may develop, from an infection taking place but once, varies somewhat; roughly speaking, it lasts about two weeks. Repeated infections manifest themselves in such a tabulation of onsets by repeated groups of cases on or about one day. Care must be, however, exercised in the interpretations of these tabulations. The occurrence of secondary cases may simulate a renewed infection.

Another thing to be learned from a study of the onsets is the probable

mode of infection. The explosive character of milk-borne outbreaks of typhoid fever is well known. Onsets scattered along over a considerable period are more likely to be due to water infection or fly transmission, but do occur even with milk-borne infections.

In an outbreak recently studied both characteristics were observed, as can be seen from the above chart showing the onsets of the cases. It will be noted that there are scattered cases throughout the month of June and that the picture, at this time, does not resemble that ordinarily seen in milk-borne infections. From the first of July on, the number of cases suddenly rises and continues high throughout the month and well into August. Despite the difference in the grouping of the cases in June and in July, all the cases belong together and were due to infected milk.

In this connection, I may call attention to the fact that in all tabulations of this kind the first of the month is apt to have an undue proportion of cases charged against it for the reason that an occurrence within a few days of the first is apt to be reported as "on the first" or "about the first." That this accounts for the extraordinary rise on the first of July shown in the above table is rendered very probable by the fact that there are no cases whatever reported with onsets July 2nd.

(*To be continued.*)

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AN IMPORTANT STEP

To the State of New Jersey is to be credited the most progressive piece of antituberculosis legislation yet adopted in the United States, or, so far as we are aware, in the world.

Some two years ago a law was enacted in that State enabling counties to erect and maintain tuberculosis hospitals and as a result three such institutions were established. It quickly became evident that the desired provision for the segregation and care of tuberculosis patients would be indefinitely delayed unless additional measures were taken. In March last a new bill was introduced in the legislature, passed by both houses and having received the signature of the Governor is now a law. Its operation will be watched with intense interest by all those concerned with the problem of public health.

Without going into details, the essentially new features of the law in question are: mandatory establishment of county tuberculosis hospitals (instead of permissory as heretofore); a subvention by the state of three dollars a week for each patient cared for in such hospitals; and, more interesting than all, a clause is added providing for the compulsory segregation of such cases as may be adjudged guilty of violating rules and regulations in regard to tuberculosis which shall be issued by the State Board of Health. A provision of great practical importance is the placing of responsibility for enforcing the law upon the State Board of Health, which body is empowered to issue orders to local boards of health and practicing physicians for the purpose.

It is encouraging to see a commonwealth take the step which expert experience demonstrated as logical.

In the absence of specific curative or immunizing agents for tuberculosis, the line of attack against that disease must necessarily be that of prevention. It is clear that the chief point of attack must be the bacillus itself. It is increasingly evident that the most effective weapon is isolation of the

infecting focus and this means nothing else than segregation of dangerous cases of consumption. It is obviously idle to order the segregation of such patients unless provision is made for their reception and maintenance. It is the frank recognitions of these implications of the situation which gives the New Jersey law its significance. A few other states, or, in some cases, cities, have adopted mildly mandatory legislation but invariably of an incomplete sort which has not met the conditions even in a theoretical way.

It remains to be seen, naturally, how this new law will work out in practice. Wisdom and tact will be demanded to an extraordinary degree. Modifications and amendments will doubtless be found necessary. Great responsibility is placed upon the shoulders of the State health authorities but it is this supervision which gives the plan its chances of success. We believe the law to be logical and in the line of inevitable development. In its essential features we believe it to be practicable and we congratulate New Jersey upon having a assumed incontestably the leading position in the formal official treatment of the tuberculosis problem.

DOCTOR SAMUEL H. DURGIN

The health officers of the four countries represented in the Amerian Public Health Association will learn with profound regret of the voluntary retirement of Dr. Samuel H. Durgin from his life work. Doctor Durgin entered the public health service in 1867 and for almost forty years has directed that service in the city of Boston. Such a length of service as health officer is probably unique, in the United States at least, where the demands of politics, rather than the qualifications of officials, has been too often the cause of change of officials. Doctor Durgin, however, has not held his position because of his ability as a political trimmer, but quite the reverse. Working in an atmosphere which at times offered little encouragement to efficient service but has rather demanded political subserviency, Doctor Durgin has thought only of the interests of Boston and his strict integrity, his high sense of duty and his great ability as an executive have won the support of many who secretly have desired to use his office for political purposes. Such a long and successful career is an inspiration and encouragement to those who believe that public office is indeed a public trust. Beginning his work during the dominance of the old school of sanitarians, and precluded by his duties from much personal research, he has, nevertheless, always been in close touch with scientific progress and has been quick to put its teachings in practice. He soon saw the fallacies of the old ideas that municipal cleansing is the all-in-all of sanitation, that disinfection is a panacea and quarantine a mere arbitrary detention. As a consequence, Boston was one of the first cities to make use of the

bacteriological laboratory. Its maritime quarantine early became a model, through the adoption of scientific and effective methods in place of the less efficient but more burdensome restrictions of commerce which Doctor Durgin found in vogue. So too Boston was the first American city to organize a comprehensive system of school inspection, a system which has now been copied by hundreds of cities throughout the United States and Canada.

Doctor Durgin very early became a member of the American Public Health Association and has always continued one of its most active supporters, serving it in various capacities from President down, and always most efficiently with his wise counsel. He saw in the Association the one existing means for co-ordinating the public health work of the country and has probably done more than any other one man to keep the Association in touch with scientific progress, to make it a leader rather than a follower. Doctor Durgin also felt the need of a closer communication between the different health officials of his own state and he was one of the promoters, and has always been an active supporter of the Massachusetts Association of Boards of Health, one of the first and most successful organizations of the kind in the country. While the health officers of America will regret that Doctor Durgin will no longer set examples for them in municipal sanitation, the members of our associations hope that they will now see more of him at their meetings and listen more often to his words of suggestion and advice. We wish him the utmost pleasure in the well earned rest which he is about to enjoy.

C. V. Chapin.

A NOTABLE REPORT

The report of the Commission on Milk Standards of the New York Milk Committee just made public in Public Health Reports for May 10, 1912, must be considered a classical contribution to the literature on milk. The eminence of the seventeen gentlemen who served on this committee is sufficient guarantee of the soundness and excellence of the report. The commission was appointed as "a direct result of the observation of the New York Milk Committee that there was great incompleteness and lack of uniformity in the milk standards, milk ordinances, and rules and regulations of public health authorities throughout the country for the control of public milk supplies."

This report will doubtless receive the wide distribution that it deserves and should have a very direct effect in making reasonably uniform the various milk standards in all parts of the country. The recommendations might very suitably be adopted by any city or town in the country and are not specialized recommendations for the New York City milk problem.

A NEW METHOD FOR THE DISINFECTION OF TUBERCULOUS SPUTUM

Preliminary Report

DR. WM. ROYAL STOKES AND DR. W. N. SCHMITZ
Baltimore, Md.

Read before the Laboratory Section, American Public Health Association, Havana, Cuba, December, 1911.

The new method of disinfection for tuberculous sputum, which we have found serviceable, contains antiformin as its basis. The advantage in using this material consists in the quick solution of the mucus and pus contained in the material disinfected. Various quantities of carbolic acid and lysol have been added to pure antiformin and it has been found that smaller percentages of these disinfectants will destroy the tubercle bacillus in sputum when used in combination with antiformin than when simply dissolved in water. The antiformin by dissolving the mucus seems to allow the antiseptics to come into direct contact with the tubercle bacilli, and we believe that this method possesses this advantage over the ordinary solutions of disinfectants used for destroying the tubercle bacilli practically in sputum.

It was found that a 3% solution of carbolic acid in the entire mixture of sputum and antiformin representing a 6% solution of the carbolic acid in the antiformin itself would destroy the bacillus of tuberculosis in one-half an hour, and a similar strength of lysol killed the tubercle bacillus in 2 hours. Equal quantities of the sputum and antiformin solution were mixed so that the 6% solution in antiformin would represent a 3% solution in the mixture of antiformin and sputum. The viability of the tubercle bacillus was tested by subcutaneous injections into guinea pigs.

The practical work consisted of a series of experiments with various strengths of a solution of lysol and carbolic acid in antiformin. The method of procedure was as follows:

A specimen of sputum known to contain large numbers of tubercle bacilli was mixed with an equal quantity of antiformin containing from 2% to 6% of either carbolic acid or lysol. This mixture was shaken slightly, and at half-hour intervals 2 c.c. were pipetted off and centrifugalized. The sediment was washed twice with sterile water, mixed with 1 c.c. of normal salt solution, and injected subcutaneously into guinea pigs. A control pig was inoculated in every instance.

From the Bacteriological Laboratory of the State and City Boards of Health, Baltimore, Md.

A PRACTICAL MODIFICATION OF THE WINSLOW DIRT FILTER

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The following apparatus is a modification and adaptation of the apparatus known as the Winslow Dirt Tester for the rapid determination of the amount of visible dirt in milk. This modification was designed primarily to overcome the difficulties which exist in testing the milk supply of New York City. These difficulties stated briefly are: 1st, those of transportation owing to the distant and varied points from which New York receives its milk supply; 2nd, the necessity of testing numerous samples of milk in a short space of time at their source in the country or upon its arrival at the wholesale plants in the city.

Winslow Filter

Individual Tester

The original Winslow Dirt Tester, which was first used in Chicago, consists of a small unit (see illustration) and is composed of two cylinders made of copper, one within the other. The outer cylinder is $7\frac{3}{8}$ inches long and $3\frac{3}{8}$ inches wide; this cylinder has a narrow piece of tubing fitted into the lower portion which is so arranged that it may be connected by means of rubber tubing with a hot water supply. In the upper portion of the cylinder is an opening providing an outflow for the water.

The inner cylinder is $7\frac{3}{8}$ inches long and $2\frac{1}{2}$ inches wide. At the bottom of this cylinder is an opening 1 inch in diameter. This opening is fitted on its outer side with a brass or copper ring surmounted by a smaller ring. There is also a removable cap with a detachable perforated brass disc. This cap is held in place by means of a copper wire. When the filter is to be used, a disc made of absorbent cotton is placed within the cap. The

inlet tube is attached by means of rubber tubing to a hot water supply and the space between the 2 cylinders is filled with water. A quart of milk is poured into the inner cylinder and is filtered through the cotton. After the milk has passed through, the cotton is removed and the process repeated. This apparatus while efficient was not suited to the needs of New York City owing to the complications previously stated.

The following apparatus was therefore planned for the purpose of eliminating these difficulties. It consists of four parts: 1st, the individual tester; 2nd, the hot water tank or jacket; 3rd, the lamp; 4th, the reservoir or carrying case.

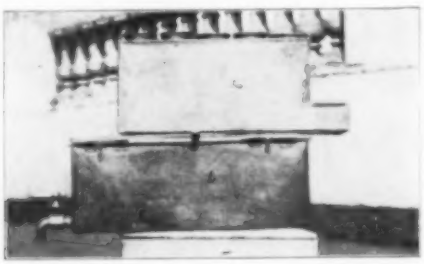
The individual tester consists of a cylinder $7\frac{1}{2}$ inches long, $1\frac{3}{4}$ inches wide at top and $1\frac{1}{4}$ inches at bottom. It is made of spun copper brased, and is fitted at the bottom with a skeleton brass cap fitted with a shoulder. Attached to the cylinder is a copper catch holding a bent wire which clasps over the cap and holds it in place; inside of these skeleton caps are small removable perforated brass discs. The small discs of cotton are bought wholesale, and when the milk is to be tested, the cotton is placed in the cap on the disc and the cap is slipped into place.

The water jacket. This water jacket was found necessary owing to the fact that cold milk or milk with ice in it does not filter rapidly. At the same time, it permits a separation of the cream, which, being finally deposited upon the filter, covers over the sediment and does not permit a true estimation of the amount of visible dirt present in the milk.

The hot water jacket is a covered box-shaped tank having ten cone shaped cylindrical openings passing through its entire depth for the reception of the individual testers, and is provided with a water inlet, situated on its upper surface. A water outlet closed with a screw cap or cork is placed in the left side wall and a steam vent is located in the upper side wall. The jacket is 18 inches long, $6\frac{1}{2}$ inches wide at the bottom; and 15 inches long; $6\frac{1}{2}$ inches wide at the top; it is $7\frac{1}{2}$ inches high and has a covered extension $2\frac{1}{4}$ inches high, 3 inches long, $6\frac{1}{2}$ inches wide, for the direct application of heat. On the under surface of the hot water tank is a movable brass bar, 9 inches long. When the apparatus is to be used this bar is placed in a transverse position and acts as a support for the tank, when the tank is placed above the reservoir.

Lamp for use with the tester. The alcohol lamp, designed for this tester, was specially constructed for the purpose of giving the greatest amount of heat it was possible to produce. It consists of a powerful burner, regulated by a screw so that the flame may be raised or lowered and a reservoir 6 inches long, $2\frac{3}{4}$ inches wide; 2 inches high, for holding the denatured alcohol. The reservoir is fitted at each end with a shoulder piece, $2\frac{3}{4}$ inches wide, 6 inches high, which has a turned edge upon its upper side. This edge slips over a corresponding ridge on the extension and holds the lamp in place when the apparatus is in use.

Carrying case or Reservoir. It was found that the most convenient case for transportation was one capable of accommodating ten individual filters, together with the water jacket and lamp. The case was accordingly made of light copper, and had the following dimensions; length, 18½ inches; height, 10¼ inches; width 7 inches. The cover was hinged and closed anteriorly with a copper wire bolt as shown in the illustration. For convenience in carrying a leather handle was attached to the cover by reinforced metal strips on the interior of the cover. The case was also planned to act as a reservoir for the milk which was being passed through the filters. When the reservoir is filled, the milk may be drawn off, through the small detachable faucet shown in the illustration, directly into a milk-can. This milk-can may be iced if the season requires it by standing it in a box of ice. In this way, any loss of milk is obviated and the milk is



Tester ready for Use
a. Water Jacket *b.* Reservoir.

not injured at all by the process; reaching the consumers a little cleaner for having undergone the filter test.

In testing out this apparatus at the creameries, we went provided with a quart dipper and two one quart measures; we, also, carried a number of one and one half inch square cards made of blotting paper. These were for the purpose of enabling us to fix the indentification of the milk which was being tested.

When the apparatus is to be used, the water tank is filled with hot water and by means of the brass bar adjusted over the reservoir. The lamp is filled with alcohol and placed under the extension, and lighted.

The faucet is attached to the reservoir and an empty can is placed underneath the faucet. When the milk is received at the platform the inspector stirs up the milk in the can thoroughly; dips out one quart, writes the number or name of the farmer upon a small white square, placing it between the individual tester and the cylinder in the water tank, and pours the milk through the tester. Owing to the heat provided by the hot water tank, the milk passes rapidly through the strainers. After the milk has been filtered the cottons are removed and placed upon the square blotters,

which bear the name or the number of the dairyman. These filter cottons are allowed to drain and are thus ready for immediate inspection by the dairymen. If it is desired to forward these samples to the laboratory for grading, the cottons are allowed to dry and then carefully packed and forwarded to the city.

If a permanent record of these sediment tests is to be kept at the creamery, it is advisable to take a piece of board and cover it with zinc or glass, ruling upon its surface squares of two inches in diameter. In these squares the farmers' names may be placed so that when the filter cottons are

Case Ready for Transportation

removed from the filters they may be immediately placed on the squares; and thus identified, kept until investigation can be made concerning the conditions under which this milk was produced.

The standard of dirt which the Department expects to adopt consists of four grades; slight, medium, excessive and maximum. It has not been decided whether the cottons are to forwarded to the laboratory for judgment or left to the judgment of the inspector. If they are to be left to the judgment of the inspectors, each inspector will be provided with a set of sample cottons, showing the grades of dirt mentioned. The maximum amount, permitted, will be that of the German Government, namely, 10 milligrams of dirt to every quart of milk.

This apparatus has been tested in a practical manner in a number of creameries and it was found that very little inconvenience was caused to the creamery operators.

If the creamery is a large one, 75 to 200 patrons, two men are required to run the test, so that the milk may not be delayed in shipment; one man to take the samples; the second man to run the filter. In this manner the milk may be handled as fast as it is brought in by the dairymen. Special investigations were also made of those dairies from which particularly bad sediments were obtained. It was found that, with few exceptions the bacteriological count and the sediment test tallied with the improper condition under which the milk was produced. Further work is being done along these lines. In closing I wish to express my thanks to Dr. W. H. Park, General Director of the Division of Laboratories for the many helpful and practical suggestions which have made this study possible.

AN INEXPENSIVE OUTFIT FOR THE COLLECTION OF BACTERIAL MILK SAMPLES

F. O. Tonney, M.D.

Director Health Department Laboratory, Chicago

Read before the Laboratory Section of the American Public Health Association, Havana, Cuba, December, 1911

The outfit here described was devised in the Health Department Laboratory, Chicago, about two years ago, and has been in continuous use since that time. It consists of a pint tin can, test tubes, pipettes, pipette can and alcohol lamp, all of which are carried in an ordinary inspector's leather sample case.

Fig. 1.

Ice Can Containing Sample Tubes, Protected by Rubber Cloth Cover.

Fig. 2.

Ice Can with Sample Tubes in Position, Showing Rubber Band Collar about Each Tube.

The can, which is used as an ice receptable, is a Karo syrup can of one pint capacity with a depressed cover in which are punched a suitable number of holes a little larger in diameter than that of the test tubes used for collecting samples. The can and cover are given a coat of rust proof paint, both inside and out. For this purpose a preparation known as Harrison Brothers' Antoxide was found to be preferable to the ordinary brands of asphaltum paint.

For the sampling tube a four inch test tube is used, about which is placed

a rubber band collar to prevent the tube from dropping through the opening. The necessity of the rubber band collar may be obviated by using a test tube a trifle longer than the height of the can.

A rubber cloth cover is placed over the can filled with test tubes, as shown in the illustration, to protect the cotton plugs from contamination. A rubber band is snapped about the cover to hold it in place.

FIG. 3.

Ice Can Showing Perforated Cover with Sample Tubes Inserted.

The pipette can is made of stove-pipe iron with folded seams, unsoldered. It is twelve inches long and has a cap three inches long fitting snugly over the open end. It can be made by a tinsmith at a cost of about forty cents. It is protected from rust by a coat of black fire-proof paint. Some difficulty was experienced in finding a suitable paint for this purpose, as many so-called fire-proof paints burn off at the first sterilization. A brand known as Carbonall, however, was found to be fairly satisfactory although a coat must be renewed at intervals of about six to eight weeks.

The pipettes are made in the laboratory from one-half inch soft glass tubing drawn to a point at one end. The opposite end is plugged with cotton.

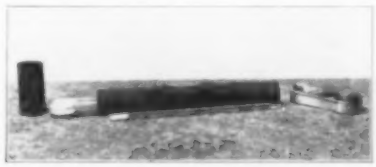


FIG. 4.

Pipette Can, Glass Pipettes and Alcohol Lamp.

The alcohol lamp is a flat type sold for heating hair curling irons. It may be obtained at any of the Department Stores at a cost of about twenty cents. A small awl is furnished for removing caps from the milk bottles.

A set of instructions is issued to each inspector who receives an outfit. He is directed to shake the milk bottle thoroughly, burn the lip of the bottle and the outside of the cap in the flame, sterilize the awl in the flame, remove the cap, collect the sample and place it in the can surrounded by cracked ice. The sample should be delivered to the laboratory not more than three hours from the time of collection.

REPORT OF THE COMMITTEE ON ORGANIZATION AND FUNCTIONS OF MUNICIPAL HEALTH DEPARTMENTS

Read before the American Public Health Association, Havana, Cuba, December, 1911.

To the American Public Health Association:

Your Committee mailed a questionnaire on the Organization and Functions of Municipal Health Departments to the Health Officers of all cities in the United States, Mexico, Canada and Cuba having a population of 25,000 or over, and received replies from eighty-eight cities.

Criticism as to the weakness of system, unsatisfactory conditions of municipal organization and suggestions founded on practical experience, for the improvement of existing evils, are treated in confidence. While general use is made of this information, names of officers and cities are not used in the report.

The population of the various cities ranges from 26,937 (Sague La Grande, Cuba) to 4,776,883 (New York City, N. Y.). Of these, 21 have a population of from 25,000 to 50,000; 25 of from 50,000 to 100,000; 20 of from 100,000 to 250,000; 7 of from 250,000 to 500,000, and 5 over 500,000.

The title of the executive officer of a health department is not of great importance, but in the majority of cities recorded in the questionnaire it is termed "Health Officer" (45) and "Commissioner of Health" (10). His appointment is by the Board of Health in 36 cities; by the Mayor in 10; by the Mayor confirmed by Councils in 8; by Councils in 6, and by the President in 2.

The tenure of office is by pleasure of the appointing power in 15 cities; no definite time in 2; during good behavior and satisfactory service in 4; one year in 10; two years in 16; three years in 5; five years in 3 and permanent in one. The salaries are from nothing to $10,000 per annum. In 2 cities the emoluments are received from fees; in 1 (Ft. Wayne Ind.) the officer is paid two cents per capita of population. In 36 cities the

[1] The Chairman of your Committee is not absolutely fixed in his own mind that the conclusions reached in this report are sound and, therefore, does not ask the approval of the Association. The report is presented to bring up the entire subject in a tangible manner for discussion and recommittal to a committee for further consideration and report on the technique and methods of operating as well as organization.

[2] Replies were received from New York City, N. Y., Detroit, Mich., Elizabeth, N. J., and Erie, Pa., after the completion of the compilation on which this report is based. The Bureau of Municipal Research of Philadelphia made a statistical tabulation of all the information received from the cities which answered the questionnaire. The Committee hereby makes due acknowledgement for the efficient aid of the Bureau and regret that the size of this study makes it impossible to print here.

entire time of the occupant is required for the performance of his duties; in 42 only part of the time.

He is directly responsible in 45 cities to the Board of Health; in 9 to the Mayor, and in others to various public officers and legislative bodies.

In the event of the health officer being under control of the Board of Health, he is a member of such Board in 15 cities, in 8 of which he is the executive officer, and in 45 cities he is not a member.

Where he is not a member of the Board of Health, his relation to that Board is of an executive character in 25 cities; of an advisory capacity in 2 cities. In 17 cities there is no Board of Health.

The members of the various Boards of Health number from one to sixty; the latter being in Montgomery, Ala., where the members of the County Medical Society constitute the Board. Five members seems to be the popular number in 27 cities. In 16 cities there are three members and in 7 cities, seven.

The Board of Health is appointed by the Mayor in 26 cities; by the legislative body in 12; by the Mayor confirmed by the legislative bodies in 8, by the Governor in 1, and elected by the people in 1.

The tenure of office of members of the Board is from one to seven years; the majority (36) being from three to five years.

In 42 cities the members serve without compensation and in 15 they are paid in various ways. In a number a fixed figure is paid per meeting, which averages about $3. Where salaries are paid they run from $100 to $500 per annum. In some cities the executive officer only is paid, while in others the lay members receive compensation, but not the physicians.

In 35 cities ordinances provide that the members shall be medical men; in 25 there is no such provision; in 8 at least one member must be a physician; in 7 at least two, and in 5 at least three must be physicians.

In answer to the question: "To what extent is the Board of Health active in executive duties?" there are twenty-four different characters of answers, the majority of which are negative. In a number no general interest is taken; in others their action is chiefly advisory, and what executive work is done as a rule, is performed by other officers who mostly class as "Health Officers" and "Sanitary Commissioners."

In 2 cities the Board meets daily; in 8, weekly; in 14, bi-monthly, and in 26, monthly. In several cities no meetings are held and in others only when called by the proper officers.

The Board is responsible to the Mayor in 14 cities; in 14 to the legislative branch of the government; in 7 they appear to have no responsibility; in 16 are responsible to the State Board, and in other cities the responsibility is divided.

In 39 cities the Board has authority to adopt a sanitary code which

has the force of law; in 21 no such power exists, and in 1 city the power is divided.

In 40 cities Councils or the legislative body, have a Committee on Health, which in most instances is perfunctory; in 34 cities no such committee exists.

In 14 cities this committee has no relationship at all with the Board of Health. In the majority of replies no answer has been made to this question.

Under these circumstances it is not surprising to find that in 32 cities the arrangement, where such committees exist, does not tend to confusion of authority. In 2 cities there is continual strife between the committee and health authorities, causing inefficiency of service.

In connection with the scope and limitation of the Health Department in most cities the registration of births, deaths and contagious diseases are entirely controlled by the Health Officer; marriages and divorces are included in but few cities; in 2, marriages are recorded, but in the majority of cases this record is kept by the City Clerk, the County Clerk, the Courts, and in 1 city by the Supreme Court. The record of divorces is kept, as a rule, by the City or County clerks, by the Courts and, in one case, by the Supreme Court. In some cities the registration of births comes under the State authorities: the State Board of Health or the State Registrar of Vital Statistics. With but few exceptions, where reports are made to the State Registrar of Vital Statistics or the State Board of Health, the registration of deaths comes directly under the municipal health department.

The control of contagious diseases comes under the municipal health department in 72 cities, and the abatement of nuisances in 77 cities. In the other cities the Board of Public Works, Sanitary Officer or Police control abatement of nuisances.

Street cleaning is under the municipal health department in but one city (Louisville, Ky.). In many of the cities (23) it comes under the Department of Public Works, while in others it is under the "Director of Service," Engineering Department, Highway Department, Sanitary Department, and various street cleaning departments under different titles. In some few cities there is a special officer with the title of Street Commissioner.

The removal of dead animals is under control of the health authorities in 48 cities; in others this comes under various public officials, Department of Public Works, Street and Highway Department, Dog Catcher, Street Sewer and Drain Department, etc.

Waste collection and disposal is handled by the health authorities in 28 cities and by the Department of Works in 11 cities.

Plumbing inspection is under the health department in 49 cities; there

is no such inspection in 4, and in 10 others this is cared for by building departments under various titles.

A bacteriological laboratory for diagnosis, research work, manufacture of antitoxins and vaccines, and milk examinations is cared for by the health department in 25 cities; in many others there is no such laboratory, and in a number part of the work only is done.

In 70 cities provision is made for milk inspection.

Inspection of food supplies is covered in 67 cities by the municipal health department, and in 5 by the State.

Inspection of dairy farms is made by the municipal health authorities in 74 cities.

A chemical laboratory for analysis of milk, food supplies and drugs is provided for in 45 cities by the health department, while in 3 this comes under the State.

Medical inspection of schools and school children is covered by the health department in 40 cities and by the Board of Education or School Board in 27 cities.

Public vaccinations come under the Board of Education in 3 cities; charity department in 3; health department in 65 and none are required in 6.

Tuberculosis: — registration, sputum examinations and fumigation — is cared for in 59 cities by the municipal health department and in 3 by the State department. Three cities cover registration and fumigation and not sputum examinations; 1 covers fumigation but not registration and sputum examinations, and 3 cover registration and fumigation, but not sputum examinations.

There are very few cities having the same rules in connection with this subject. In many replies the question is not answered as to whether the following tuberculosis institutions are under the health department:

a. dispensaries.
b. day or night camps.
c. sanatoria for incipient cases.
d. hospitals for advanced cases.

6 cities reply in the negative to all.
4 " " "yes" to a, c and d.
3 " " " " a and b.
2 " " " " d.

Families of the tuberculous are given assistance in 17 cities by the Department of Charitiees, and in other cities through private agencies under various titles.

General fumigation for contagious diseases is conducted by the health department in 78 cities; in 1 soap and water cleansing is used; in another fumigation is not required, and the question is not answered by the other cities.

Free medical attendance on the indigent sick is provided in 77 cities, in 22 of which it is under control of the health department. In 2 cities assistance is rendered by the health department in cases of contagious diseases only; and in the balance of cities this activity is under control of various departments, viz.: the Department of Charities under various titles in 13 cities, City Councils, County Boards, County Directors, Physicians and State Boards.

District nurses are employed by the health department in 18 cities; in 7 they are under municipal charity boards; in 22 under various private and organized charities, and in 3 under State control.

Public education in hygiene, and sanitation, is under the health department in 10 cities, and under various other activities in a number of cities. A great variety of means are employed, the most common of which are lectures, leaflets, bulletins, newspaper publicity, moving pictures (in 3 cities), and public schools (in 5 cities).

Tenement house inspection is conducted under the health authorities in 58 cities; by building inspectors in 2, and by State authorities in 2.

Inspection of lodging houses is conducted by the health department in 15 cities (only 5 of which are in the United States); by the health department in conjunction with the police department in 2, and in 12 by other departments, such as Councils, State Tenement House Commission, etc.

Inspection of general housing conditions is conducted by the health department in 59 cities, and in 13 cities comes under building inspectors and private agencies.

Child Hygiene is under the control of the department of health in 26 cities; under the Board of Education in 4 cities, and under private organizations in 7 cities.

The work of the health department is done under city ordinances, sanitary code enacted by the Board of Health and State laws; under a combination of these in 49 cities; under city ordinances and State laws in 20 cities; and under sanitary code and State laws in 5 cities.

All practicing physicians are required to register with the Board of Health in 35 cities and in 40 no such registration is required.

Requirements for registration vary materially: 2 cities require filing of diploma with the Court or License Clerk; 5, the filing of diploma with the health authorities; 2, registration at county seat; 2, merely filing name and address; 8, filing of State license, and 9, certificate from State Board of Medical Examiners. Where physicians are not required to register with the health authorities they register with the State Board in 5 cities, and in 9 with various county officers.

Physicians are required to report all births to the health authorities in 59 cities; in 20 to city or county clerks, and in 10 no report is required. The time limit allowed for report is, as follows:

In	4	cities	within 24 hours.
	2	"	" 36 "
	3	"	" 3 days.
	9	"	" 5 "
	21	"	" 10 "
	1	"	" 15 "
	2	"	" 30 "
	1	"	" the calendar month.
	1	"	" 2 months.
	2	"	before the first day of the succeeding month.
	4	"	within the fifth day of the following month.
	1	"	" " seventh" " " "
	6	"	there is no time limit.

Physicians are required to report all deaths to the health authorities in 55 cities; in 1, only deaths from contagious diseases; in 2, report must be made to the city clerk, and in 13 there are no requirements. In 35 cities there is a time limit for reporting, as follows:

In	3	cities	at once.
	1	"	within 2 hours.
	1	"	" 6 "
	13	"	" 24 "
	2	"	" 36 "
	3	"	" 2 days.
	1	"	" 3 days.
	1	"	" 5 "
	2	"	" 10 "
	1	"	" 30 "
	6	"	before burial.
	1	"	" the seventh of the succeeding month.

Most cities require reporting of some communicable disease, varying from one (smallpox), in 1 city to thirty-nine. Time allowed for making report is:

In	1	city,	as soon as possible.
	2	cities	at once.
	4	"	within 6 hours.
	10	"	" 12 "
	24	"	" 13 "
	1	"	" 14 "
	1	"	" 36 "
	2	"	" 1 week.

Forty-three cities require physicians to report recovery from reportable diseases; 1 city requires report in diphtheria and scarlet fever only, although all communicable diseases are reportable, and 1 city makes requirement in diphtheria only, although there are eight diseases specified as reportable.

There are a variety of measures employed for detecting unreported

births, deaths, contagious diseases and recoveries from contagious diseases. In 26 cities no effort is made to check any of these reports; in 8, upon receipt of death notices, a search of the birth records is made to ascertain if birth has been reported; 2 use the baptismal records in churches; 2 make a house-to-house canvass; 2 employ school nurses and examine church records; 1 has a regular "baby census" taken by the City Clerk, and in 1 monthly visits are paid to the physician. In cities where deaths are reported, 9 have no checks for detection of failure to report; in 15, burials or removals cannot occur without permit from the Board of Health; in 3 the notices in the daily papers are scanned, and in single cities the police, nurses and medical inspectors are variously used. From many cities the replies to the question on this subject are unsatisfactory. To keep check on reports of contagious diseases the school medical inspectors are used in 7 cities; in 8, sanitary medical inspectors; in 11, a careful examination is made of the list of absentees from school; in 2, arrests are made for failure to report; in 3 rumors are investigated; in 1, tab is kept on the sale of antitoxin, and in 1, personal notes in the daily papers are watched. The necessity for using any check in reporting recoveries from contagious diseases is denied in 7 cities; in 5 it is necessary to have recoveries reported before the placard is taken down; in 6, cases of contagious diseases are followed up and checked by medical inspectors; in 2, sanitary inspectors keep a check on this; in 4, the attending physicians' reports are relied upon, and in single cities reports are made by nurses, the school physician, truant school officer and quarantine guard.

All births are reported in 3 cities:
95 per cent. in 2 cities.
90 " " 7 "
85 " " 1 "
80 " " 4 "
75 " " 1 "
60 " " 1 "
50 " " 1 "
fairly " 1 "
fully " 1 "
Indifferently " 1 "

All deaths are reported in 14 cities.
fully " 7 "
90 per cent. " 1 city.

All contagious diseases are reported in 3 cities.
95 per cent. " 3 "
90 " " 2 "
80 " " 1 city.
75 " " 2 cities.
fairly " 1 city.
fully " 3 cities.
Indifferently " 3 "

Diphtheria, typhoid fever and scarlet fever are well reported and the balance of contagious diseases:

	poorly	" 1 city
	fully	" 1 "
80	per cent.	" 2 cities; balance poor.
95	"	" 1 city; " "

In 1 city 90 per cent. of tuberculosis is reported; balance of contagious diseases, 70 per cent.

From the meager replies to the question in reference to the co-operation of physicians in reporting recoveries from contagious diseases it is to be judged that but little attention is paid to this important subject. Of the 7 cities replying in full, the answers are from "fair" to 90 per cent. of recoveries reported. The remaining answers to this series of questions cannot be used for statistical purposes, due possibly to the misunderstanding of the question, as the replies for the most part are unintelligible.

The question was asked whether the most efficacious method of securing full reports from physicians was (a) by persuasive measures, including personal appeals in cases of actual delinquents, or (b) universal reporting of delinquents to court and the imposing of a stipulated fine. Fifty-six cities replied in favor of the former; 6 in favor of the latter; 5 believed that the former method should be used, with an occasional prosecution; 5 in the combination of both methods. This question was not answered in a number of cases and in some few the answer was unsatisfactory.

Most cities reported good co-operation of the medical profession with the municipal health department, both in the regular routine backing-up of the department among their patients and in active support under emergency conditions. In replies to this question from 36 cities the following terms are used: "Hearty, full, complete, excellent, very good co-operation of the profession at all times." A few cities report on the percentage of the profession that co-operate. In 1 city there is 95 per cent. in 1, 80 per cent., and in 2, 75 per cent. of the medical profession that co-operate with the health authorities. Six cities use the term "generally" and in a majority of instances, "co-operate." In 1 city there is a fair co-operation at times, but excellent at times of emergency; 3 cities report "fair co-operation"; 1 city, "some interest"; in 1 city the interest is variable; in 4 there is but very little interest taken, and in 2 decided antipathy by the profession to the department.

There are very few health departments that have any systematic means of keeping the physicians actively in touch with the authorities, in acquainting them with general and special health conditions. Ten cities issue bulletins; 2, weekly; 4, monthly, and the balance not stated. Four cities issue special circulars as occasion requires; 5 issue circular letters when anything of importance arises; in 3 cities the medical profession is

kept in touch with the work by personal attendance of the health officer at meetings of the medical societies; in 19 reports of vital statistics are issued at periods, varying from a month to a year; the daily press is used in 5 cities and no means of securing this necessary aid is employed in 11 cities.

The proper organization of a health department depends largely upon the size, location and activities of a city. Modifications must be made in accordance therewith; for example, in residential cities inspections in connection with manufactories would not be needed; in cities where the tenement house problem does not exist, no tenement house inspection would be required; and there are some subjects incorporated herein that many believe should not be chargeable to a health department, such as plumbing inspection and collection of garbage. But in the following organization plan attempt will be made to cover everything, as the elimination of the unnecessary can be made as required. For example: a scheme for a city of 500,000 population is mapped out, allowing roughly a 20 per cent. increase in the number of employees and 10 per cent. increase in salaries for every 100,000 population over 500,000 and up to 1,000,000 (when the limit of increase of most salaries is reached and the ratio of increase of employees diminishes) and, in a similar manner, a 20 per cent. decrease number of employees and 10 per cent. decrease in salaries for every 100,000 population under 500,000.

The Mayor should be *ex-officio* a member of the Board of Health.

The Board of Health should consist of the health commissioner, head of the department of public safety, head of the department of public works, and two others to be appointed by the Mayor with or without the endorsement of the legislative body of the city government, one of whom should be a sanitary engineer and one a lawyer. The Board should serve without salary. The functions of the Board should be purely legislative and advisory. It should be clothed with power to enact laws in relation to the public health and declare nuisances prejudicial to the public health. These arbitrary powers are too great to invest in any one man. The Board should also have the appointment of its secretary and of the health commissioner.

The co-operation of the police is necessary for the effective administration of a health department as, without this, quarantine cannot be maintained and laws cannot be enforced. In most American cities the police are organized for repression of violence and protection of life and property. With the head of the department a member of the Board of Health the police can be organized to repress disease and preserve health. They intimately know the highways and byways and could report nuisances of all kind; they could keep track of the ash can, garbage can, waste paper and rubbish — become, in fact, sanitary inspectors without adding much

to their labors and be an important factor in economy of municipal administration.

The head of the Department of Public Works should be a valuable man with his knowledge of sewer construction, sewage disposal, the water problem, opening of streets, the survey of the city in its relation to grades, surface drainage, etc.

These officials, if interested, could throw the influence of their departments in aid of the Health Department and accomplish results not otherwise obtainable.

The Board should have a secretary at a salary of $1,000 per annum.

The Commissioner of Health should receive a salary of $5,000 per annum and be under the control of the Board of Health only in so far as pertains to the execution of the laws enacted by them, but he should be under their influence as acting in an advisory capacity. The commissioner should be the supreme executive of the Municipal Department of Health. His appointment should be permanent and influenced by efficiency and not politics. Inefficiency or malfeasance in office should be the only cause for discharge. The power of discharge should lie with the Board subject to an appeal by the Commissioner to a Court of Record, provided such appeal be taken within ten days.

The various bureaus should each have a chief, at an average salary of $2,000, who should be the executive head of the bureau, reporting only to the health commissioner.

1. Bureau of Medical Inspection:

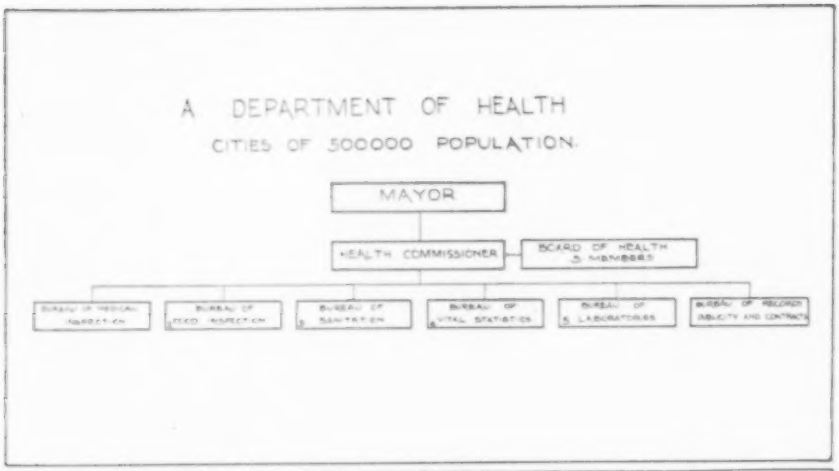
The chief of this bureau should have a clerk at $800 and a stenographer at $650. The bureau should control the following divisions:

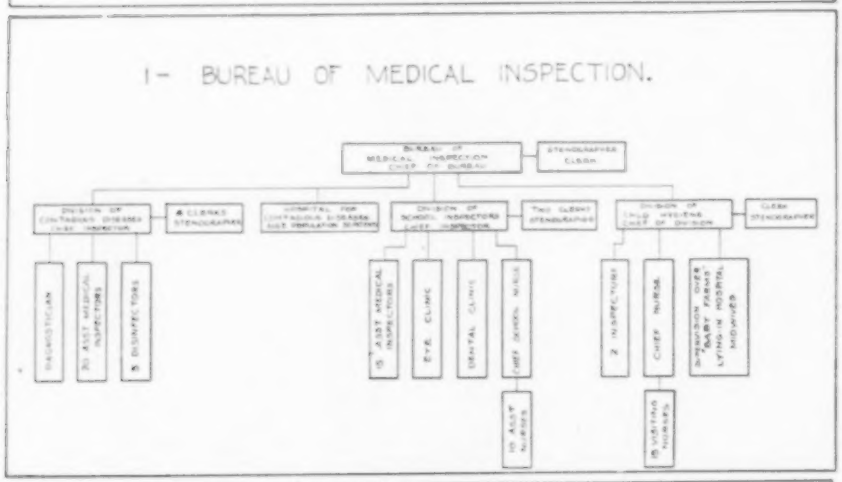
a. Inspection of Contagious Diseases.
b. Hospital for Contagious Diseases.
c. School Inspection.
d. Child Hygiene.

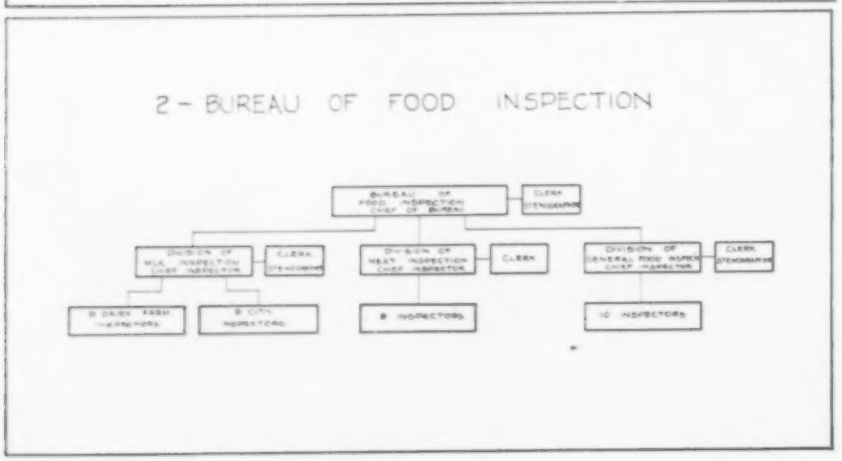
(a) Division of Inspection of contagious diseases should have two clerks at $800 and one stenograpner at $650; a chief inspector at $1,800; 10 assistant inspectors at $1,200; 1 expert diagnostician, paid by fees which, for calculation, would amount to $800 per annum, and 5 disinfectors at $1,000.

(b) A hospital for contagious diseases (excepting tuberculosis) should be maintained as the best means of preventing the spread of contagion by the prompt removal from the homes in the slum districts of those suffering from contagious diseases. Such an institution, accommodating on an average of 50 patients per day with maintenance of $1.30 per diem, would cost $23,725 per annum.

In most cities advanced tuberculosis is cared for in the City Poor Hos-


A DEPARTMENT OF HEALTH
CITIES OF 500000 POPULATION
MAYOR
HEALTH COMMISSIONER
BOARD OF HEALTH
5 MEMBERS
BUREAU OF MEDICAL INSPECTION
BUREAU OF FOOD INSPECTION
BUREAU OF SANITATION
BUREAU OF VITAL STATISTICS
BUREAU OF LABORATORIES
BUREAU OF RECORDS ABILITY AND CONTACTS


1- BUREAU OF MEDICAL INSPECTION.
BUREAU OF MEDICAL INSPECTION CHIEF OF BUREAU
STENOGRAPHER CLERK
DIVISION OF CONTAGIOUS DISEASES CHIEF INSPECTOR
4 CLERKS STENOGRAPHER
HOSPITAL FOR CONTAGIOUS DISEASES VENEREAL DISEASES
DIVISION OF SCHOOL INSPECTORS CHIEF INSPECTOR
TWO CLERKS STENOGRAPHER
DIVISION OF CHILD HYGIENE CHIEF OF DIVISION
CLERK STENOGRAPHER
DIAGNOSTICIAN
20 ASST MEDICAL INSPECTORS
5 DISINFECTORS
15 ASST MEDICAL INSPECTORS
EYE CLINIC
DENTAL CLINIC
CHIEF SCHOOL NURSE
10 ASST NURSES
2 INSPECTORS
CHIEF NURSE
15 VISITING NURSES
SUPERVISION OVER BABY FARMS LYING-IN HOSPITAL MIDWIVES


2- BUREAU OF FOOD INSPECTION
BUREAU OF FOOD INSPECTION CHIEF OF BUREAU
CLERK STENOGRAPHER
DIVISION OF MILK INSPECTION CHIEF INSPECTOR
CLERK STENOGRAPHER
DIVISION OF MEAT INSPECTION CHIEF INSPECTOR
CLERK
DIVISION OF GENERAL FOOD INSPECTION CHIEF INSPECTOR
CLERK STENOGRAPHER
8 INSPECTORS
10 INSPECTORS

pital by the Department of Charities, and incipient cases by private charities. In an ideal organization the Health Department should super intend all activities for the study, prevention and treatment of tuberculosis through its division of contagious diseases, day camps, dispensaries, sanitoria and, most important of all, institutions for segregation of advanced cases.

(c) Division of School Inspection should have one chief inspector at $1,800. He should instruct school teachers in the proper methods of teaching social, sex and personal hygiene, and supervise 15 assistant inspectors at $900; a dental dispensary, $2,000; an eye dispensary, $2,500; chief school nurse, $1,000; 20 assistant nurses at $700; 2 clerks at $800 and 1 stenographer at $650.

(d) Division of Child Hygiene: Chief of the division, $1,800; 2 clerks at $800; 1 stenographer at $650; 1 inspector at $1,000; chief municipal nurse at $1,000; 15 visiting nurses at $700. This division should provide for examination, licensure and control of midwives, "baby farms" and so-called "lying-in" establishments, as well as for milk stations and all special endeavors for children; and should co-operate with private associations.

2 — Bureau of Food Inspection:

This bureau should have a clerk at $800, a stenographer at $650 and the following divisions:

a. Milk Inspection.
b. Meat (Fish and Fowl) Inspection.
c. General Food Inspection.

(a) Division of milk inspection: This division should have a chief at a salary of $1,800; 6 dairy farm inspectors at $1,000; 8 city inspectors at $900, for examination of pasteurizing plants and of milk on the platform, in the wagons and in the stores; and 1 clerk at $800.

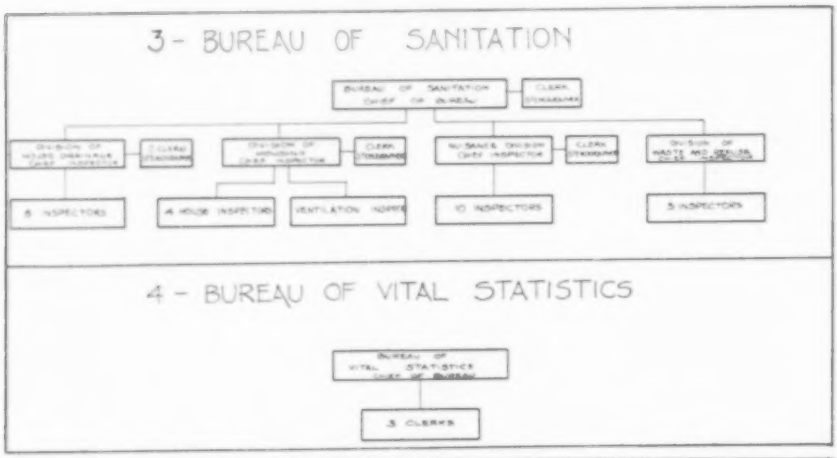
(b) Division of Meat Inspection should have a chief — preferably a veterinary physician — at $1,800; 4 inspectors (veterinarians) at $1,400; 4 inspectors (lay) at $1,000, and 1 clerk at $800.

(c) Division of General Food Inspection should have a chief at $1,800; 5 assistant inspectors at $900; a clerk at $800, and a stenographer at $650. The duty of this Division is to inspect all places where food may be prepared — bakeries, restaurants, hotels and cold storage plants, and inspect the transportation of food and food exposed for sale.

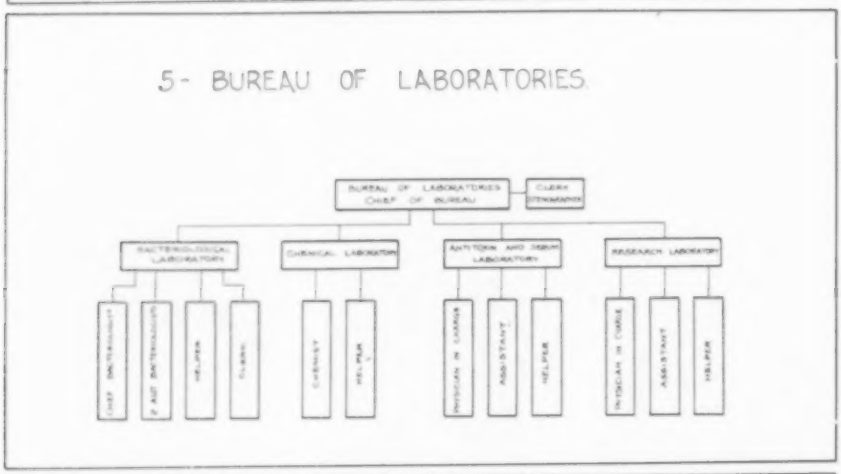
3 — Bureau of Sanitation:

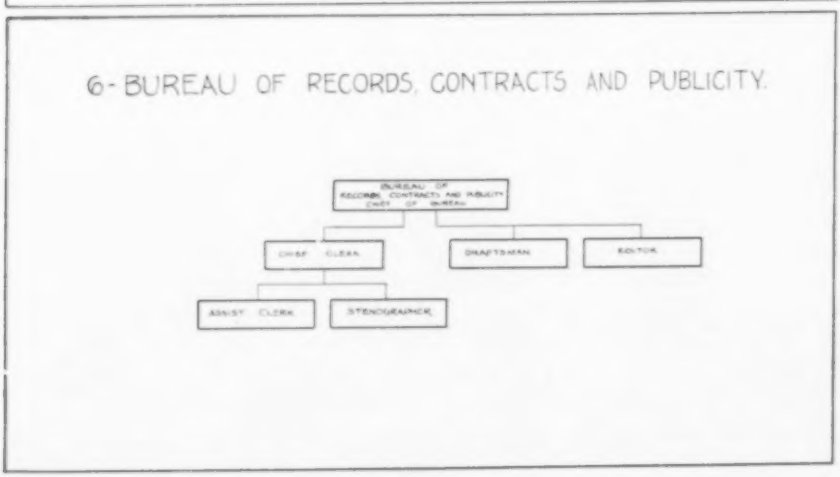
The chief of this bureau should be preferably a sanitary engineer. The bureau should have a clerk at $800, a stenographer at $650 and the following divisions:

a. House Drainage.
b. Housing.
c. Nuisances.
d. Wastes and Refuse.


3 - BUREAU OF SANITATION
BUREAU OF SANITATION
CHIEF OF BUREAU
CLERK STENOGRAPHER
DIVISION OF HOUSE SANITATION
CHIEF INSPECTOR
CLERK STENOGRAPHER
DIVISION OF HOUSING
CHIEF INSPECTOR
CLERK STENOGRAPHER
NUISANCE DIVISION
CHIEF INSPECTOR
CLERK STENOGRAPHER
DIVISION OF
5 INSPECTORS
4 HOUSE INSPECTORS
VENTILATION INSPECTOR
10 INSPECTORS
5 INSPECTORS

4 - BUREAU OF VITAL STATISTICS
BUREAU OF
VITAL STATISTICS
CHIEF OF BUREAU
3 CLERKS


5 - BUREAU OF LABORATORIES
BUREAU OF LABORATORIES
CHIEF OF BUREAU
CLERK STENOGRAPHER
BACTERIOLOGICAL LABORATORY
CHEMICAL LABORATORY
ANTITOXIN AND SERUM LABORATORY
RESEARCH LABORATORY
CHIEF BACTERIOLOGIST
2 ASST BACTERIOLOGISTS
HELPER
CLERK
CHEMIST
HELPER
PHYSICIAN IN CHARGE
ASSISTANT
HELPER
PHYSICIAN IN CHARGE
ASSISTANT
HELPER


6 - BUREAU OF RECORDS, CONTRACTS AND PUBLICITY.
BUREAU OF
RECORDS, CONTRACTS AND PUBLICITY
CHIEF OF BUREAU
CHIEF CLERK
DRAFTSMAN
EDITOR
ASSIST. CLERK
STENOGRAPHER

(a) Division of House Drainage should have a chief at $1,500; 1 clerk at $800; clerk and stenographer at $800, and 5 inspectors at $1,000.

(b) Division of Housing should have a chief at $1,800; 4 tenement and lodging house inspectors at $900; 1 special inspector of ventilation to examine all public and semi-public buildings at $1,200; 1 clerk at $800 and a stenographer at $650.

(c) Division of Nuisances should have a chief at $1,800; 9 inspectors of Nuisances, including those of offensive trades, stables and housing of animals at $900; 1 smoke inspector at $900; 1 clerk at $800 and a stenographer at $650.

(d) Division of Wastes and Refuse should have a chief at $1,500 and 3 inspectors at $900.

4 — Bureau of Vital Statistics:

The chief of this bureau should not only keep an accurate record of deaths, births, marriages, registration of physicians and midwives, but compile statistics for the bureau of records and contracts. He should have a salary of $1,500 and 3 clerks at $800.

5 — Bureau of Laboratories:

The chief of this bureau should be preferably a bacteriologist and receive a salary of $2,000 per annum. This bureau should include the following:

Chief Bacteriologist	$1,500
Assistant Bacteriologist	1,000
Helper	600
Clerk	800
Chief Chemist	1,200
Helper	600
Physician in charge of Antitoxin and Serum Laboratory	1,500
Assistant	1,000
Helper	600
Hostler	600
Physician in charge of Research Laboratory	1,200
Assistant	1,000
Helper	600

The Chemical, Antitoxin and Serum, and Research laboratories may be eliminated from cities of 500,000 population as an economic problem, as examinations made in the first-named and the products of the second named laboratories may be purchased for less money than the maintenance cost of the laboratories; and research work may be carried on in institutions other than municipal. For cities of 1,000,000 and over there is no question that the municipal laboratories are more economical.

6 — Bureau of Records, Contracts and Publicity.

The chief of this bureau should receive $2,000. He should personally conduct all publicity; edit a weekly bulletin and all circulars for educa-

tional purposes; compile all statistics of the department; be responsible for all records and contracts and take care of all accounts of the different bureaus. The bureau should have a chief clerk at $1,200; a draftsman at $1,000 to chart and prepare data for benefit of the public: a clerk at $800 and a stenographer at $650.

Total cost as enumerated, 41 cents per capita of population	$204,975
Allowing $5,000 for postage, printing and incidentals, the cost would be 42 cents per capita	233,175
Allowing $17,000 for new equipment and supplies the cost would be 45 cents per capita	250,000

a cheap investment for any community, for, with such organization, efficiently handled, the returns in improved health, less suffering, lowered mortality, increased vigor and general civic uplift would be impossible to figure in dollars and cents.

In organizations for cities under 100,000 population similar units will avail. For example: In cities, say of 25,000 inhabitants, the allowance would be at 45 cents per capita, $11,250. This amount, although small in comparison, will accomplish the same results as the larger sum in larger cities. Here the various bureaus and divisions are dropped; the medical inspector would be a practitioner of medicine and devote to municipal work but a few hours a day; 1 inspector would cover general sanitation and nuisances of all kinds; 1 would cover milk, meat and all foodstuffs; 1 clerk would attend to the entire division of vital statistics; laboratory examinations would be made in a hospital; and the health commissioner, devoting his entire time to his official duties, should take over the duties of the several bureau chiefs; edit all educational leaflets, compile statistics and prepare all data for public information, etc. This small, but thoroughly efficient force could be secured for $11,250 per annum — a 45 cent per capita.

Jos. S. Neff, *Chairman*

Dr. J. H. Landis, a member of the Committee, submitted the following statement to the Chairman: "I have gone over your plan of organization of Municipal Health Departments and agree heartily with all but the organization of the Board. While the presence of the directors of Public Safety and Service on this Board would theoretically be desirable, I believe that a non-partisan Board will secure better results."

APPENDIX.

Commissioner of Health		$5,000
Secretary, Board of Health		1,000
Bureau of Medical Inspection.		
Chief	$2,000	
Clerk	800	
Stenographer	650	
		$3,450

(a) *Division of Contagious Diseases.*

Chief	$1,800	
2 clerks at $800	1,600	
1 stenographer	650	
10 assistant medical inspectors at $1,200	12,000	
Diagnostician	800	
5 disinfectors at $1,000	5,000	
Hospital (50 patients)	23,725	
		$45,575

(b) *Division of Medical School Inspection.*

Chief	$1,800	
2 clerks at $800	650	
Stenographer	650	
15 assistant medical inspectors at $900	$13,500	
Dental dispensary	2,000	
Eye dispensary	2,500	
Supervising school nurse	1,000	
20 nurses at $700	14,000	
		$37,050

(c) *Division of Child Hygiene.*

Chief	$1,800	
2 clerks at $800	1,600	
Stenographer	650	
Inspector	1,000	
Supervising visiting nurse	1,000	
15 nurses at $700	10,500	
		$16,550
		$102,625

Bureau of Food Inspection.

Chief	$2,000	
Clerk	800	
Stenographer	650	
		$3,450

(a) *Division of Milk Inspection.*

Chief	$1,800	
Clerk and stenographer	800	
6 dairy farm inspectors at $1,000	6,000	
8 city inspectors at $900	7,200	
		$15,800

(b) *Division of Meat Inspection.*

Chief	$1,800	
Clerk	800	
4 veterinary inspectors at $1,400	5,600	
4 veterinary inspectors at $1,000	4,000	
		$12,200

(c) *Division of General Food Inspection.*			
Chief	$1,800		
Clerk	800		
Stenographer	650		
5 inspectors at $900	4,500		
		$7,750	
			$39,200
Bureau of Sanitation.			
Chief	2,000		
Clerk	800		
Stenographer	650		
		$3,450	
(a) *Division of House Drainage.*			
Chief	$1,500		
Clerk	800		
Clerk and stenographer	800		
5 inspectors at $1,000	5,000		
		$8,100	
(b) *Division of Nuisance Inspection.*			
Chief	$1,800		
Clerk	800		
Stenographer	650		
10 inspectors at $900	9,000		
		$12,250	
(c) *Division of Housing Inspection.*			
Chief	$1,800		
Clerk	800		
Stenographer	650		
4 tenement and lodging house inspectors at $900	3,600		
1 inspector of ventilation	1,200		
		$8,050	
(d) *Division of Refuse and Waste.*			
Chief	$1,500		
Clerk and stenographer	800		
3 inspectors at $900	2,700		
		$5,000	
			$36,850
Bureau of Vital Statistics.			
Chief	$2,000		
3 clerks at $800	2,400		
		$4,400	
			$4,400
Bureau of Laboratories.			
Chief	$2,000		
Clerk	800		
Stenographer	650		
		$3,450	

Bacteriological Laboratory.			
Chief	$1,500		
Clerk	800		
Assistant	1,000		
Helper	600		
		$3,900	
Chemical Laboratory.			
Chief	$1,200		
Helper	600		
		$1,800	
Serum and Antitoxin Laboratories.			
Chief	$1,500		
Helper	600		
Hostler	600		
		$2,700	
Research Laboratory	$1,200		
Assistant	1,000		
Helper	600		
		$2,800	
			$14,650
Bureau of Records.			
Chief	$2,000		
Chief Clerk	1,200		
Draftsman	1,600		
Clerk	800		
Stenographer	650		
		$5,650	
			$5,650
			$209,375

RETIREMENT OF DR. SAMUEL H. DURGIN FROM THE BOSTON BOARD OF HEALTH

Extracts from an article by Mr. George A. Babbitt, Boston Herald, April 29, 1912.

Chairman Samuel H. Durgin of the Health Department appears to be scheduled for retirement under the veterans' pension act . . . If one were to judge from the personal appearance of Chairman Durgin, it would be difficult to conclude that he is now in his seventy-third year. His dapper figure, his spry and elastic step, his unwrinkled brow and his clear eye give him the aspect of middle age, rather than of more than threescore and ten. And yet it is recorded that he was born in Bucksport, Me., July 26, 1839. His advanced age is not so notable, however, as is the length of his service in the Boston City government. He was appointed port physician and resident physician at Deer Island as early as 1867, so his tenure as a municipal officer covers an unbroken period of forty-five years, forty of which he has been at the head of the Boston Health Department. He thus outranks all of our municipal officials in length of service.

In view of his prospective retirement, it is not premature to review Chairman Durgin's official career, and to estimate the value of his services to the city. In doing so, it is not necessary to lose sight of the fact that he has had his shortcomings, or that he has been subject to more or less reasonable criticism. In this respect he does not differ from about all our municipal officials nowadays, good, bad and indifferent, and it not infrequently happens that the greater the efficiency of the official the more frequent and vehement the criticism. Perhaps the most conspicuous of Chairman Durgin's shortcomings, if it may be called such, has been his exceeding modesty. During his long term of service he never acquired or practiced the somewhat prevalent and popular art of blowing his own trumpet, or of mounting the housetops to proclaim the achievements of the department over which he has presided. He has preferred to let results speak for themselves. He has not only failed to practice this blatant art, but he has abhorred it. It has been his notion that work for the protection of the public health should be done quietly, almost stealthily, in order to achieve the best results. If an epidemic of any kind was threatening, he has taken measures to check it without any unnecessary noise. Some of his most ardent critics, official and unofficial, have denounced this course on his part, maintaining that if the health of the people was in danger they ought to know it promptly and all together. It was Chairman Durgin's habit to remind these critics that next to the actual existence of a widespread epidemic the worst thing was public excitement and apprehension concerning it, and that this sort of agitation was not only unwarranted, as a rule, but that it wrought incalculable injury to the welfare of the city. And so it has happened that in a great majority of cases, threatened epidemics in Boston have been dealt with and averted without any public alarm. Thus the health department, under Chairman Durgin's direction, has been accomplishing good work which the general public knew nothing about.

Perhaps in none of the sciences has there been greater progress in the last quarter of a century than in that of public hygiene. During that time many and great discoveries have been made in the line of preventive medicine. Old theories and methods have been discarded and new ones have taken their places. There is a more or less popular impression that the old practitioners in all branches of medicine and sanitation have passed out with the old doctrines and appliances, and that in progressive communities the new order of things is or should be administered by representatives of the new school. No doubt this impression has operated somewhat to Chairman's Durgin's disadvantage. . . . Those who have watched him carefully and intelligently know that he

has kept pace with the progress of his profession and that he has not allowed his reverence for the old moon to obscure his view of the new one. There has been no new departure in sanitary science that has not received his careful attention and been accorded the recognition to which its merits have entitled it. This has been particularly the case in bacteriological work, which is now recognized as one of the more essential features of an effective health department. Boston was the first city to undertake the medical inspection of pupils in the public schools. This scheme was first proposed and put in operation by the Boston Board of Health under Chairman Durgin's direction, and its benefits are attested by the fact that it has since been put in practice by all the cities of the country, as well as in most of the towns. Coincidently with his local work, Chairman Durgin has been an active and influential member of the leading state and national health organizations where questions relating to the protection and promotion of the public health are discussed, and he has shown himself in full accord with the progressive sentiment of these expert bodies.

Few public officials have possessed the confidence and support of their profession to the extent that Chairman Durgin has. He could always count upon the practically solid backing of his fellow doctors in his work and thay have never faltered in their cordial cooperation with him. It is no secret that not a few of the many mayors under whom he served have had it in mind to supersede him, but they have always thought better of it after hearing from the representative members of the medical profession who have stood behind him to a man. Doubtless this fact explains his survival of about all his contemporaries in municipal officialdom who one after another have succumbed to the frequent mutations of politics in city government, during his long term of service. The physicians of Boston have known and respected Chairman Durgin and they have made that fact effectively known.

To any one acquainted with the internal workings of commissions it is easily apparent that in order to secure the best results in such organizations there must be a recognized leadership. Without it there would be a lack of harmony that would be fatal to effective work. . . . Dr. Durgin has been distinguished for his tact, suavity and uniform courtesy and his relations with his associates have generally been so pleasant as to prevent anything like friction. As the official spokesman of the Board he has sustained equally pleasant relations with the general public. He has had to deal with all classes and conditions of people, with all kinds of grievances. Complainants of all varieties, politicians, faddists, cranks and others who deem it their duty or privilege to pester public officials have received from him all the consideration which was their due. Whenever he has been called to account for any alleged dereliction of duty he has responded freely and frankly to his critics and has generally had the better of the argument. More than one mayor of Boston has called upon him at the peril of losing his official head to do what he could not see his way clear to do, and more than once he has told the threatening mayor to proceed with the sacrifice, if that was the necessary alternative. The mayor has invariably retreated and the head of the Health Department has remained unmolested if not undisturbed.

The $2,500 pension on which Chairman Durgin will retire represents but an infinitely small fraction of the value of the benefits which he has rendered to the city in his official capacity. When he first came into office he found the city in the grip of a smallpox epidemic that had carried off hundreds of people. This was soon suppressed and since that time no preventable disease has reached epidemic proportions in Boston and the sanitary condition and general health of the city are now better than they ever have been. This is a record of which any retiring official has a right to be proud, and the city which he has so efficiently served may well rejoice to share in this satisfaction.

Having served for a period of 21 years as a colleague of Chairman Durgin on the Board of Health, I reckon myself qualified to testify thus fully and cordially as to his official record and achievements.

BOOK REVIEWS

Report upon Sewage Disposal for Pittsburgh, Pa.

Messrs. Hazen and Whipple, under date of January 30, 1912, have presented to Mr. N. S. Sprague, Superintendent of the Bureau of Construction of Pittsburgh, Pa., a plan and report for a comprehensive sewerage plant for the collection and disposal of all the sewage of the city. This report, together with a supplementary report by Messrs. Frederick P. Stearns and Harrison P. Eddy, who have examined the details of Hazen and Whipple's report and concur in their conclusions, and also with a letter of transmissal by Mr. Sprague discussing these reports, have recently been published.

Hazen and Whipple find after reviewing the various communications of the State Commissioner of Health that in order to conform with the requirements of the Commissioner it will be necessary to devise a method for the collection of the sewage from the whole city of Pittsburgh and for purifying it before discharging it into the river. Such purification is required solely from the standpoint of drinking waters taken from the river below. The Commissioner does not suggest that any other objects are to be attained or desired. It is pointed out that most of the large existing works have been constructed and operated solely with reference to the prevention of physical nuisances, such as the fouling of waters by deposits and the production of offensive odors. In the few cases where works have been built for the protection of water supplies they have been small and the cost of treatment has been borne by the municipality whose water supply was benefited. The present problem is, therefore, a novel one and without precedent.

The installation of sewage purification works of the type that have been installed by all of the larger American cities which have taken up this matter at all would fail to prevent the passage of infectious material and would, therefore, not accomplish the desired purpose. The present problem is taken up on a basis of considering only those methods which will be reasonably efficient and certain in stopping the discharge of infectious matter. The preliminary investigations involved laboratory studies of the chemical and biological nature of the sewage and of the river water covering a period of over a year; stream and sewer gaugings, and physical examination of the rivers by boat, supplemented by an extended inquiry of those whose business takes them frequently upon the river or near it, as to the condition of the water and the effect of pollution upon it.

In determining the size and cost of these works provision is made for the ultimate inclusion of a population of 1,900,000 people. This is three and a half times the present population of the city of Pittsburgh and is intended to include a considerable portion of the surrounding territory. The works as outlined and as considered essential for carrying out the requirements of the Commissioner of Health are:

1. A separate system of sewers throughout the city.

2. Intercepting sewers having a capacity of 300 gallons per capita for a population twice as great as that shown by the census of 1910.

3. A pumping station.

4. A complete system of purification works located on Neville Island.

Plans for these works have been developed sufficiently to afford a basis for making and estimating all cost of construction and of operation.

Provision for a separate system is to be made by using present sewers for drainage and storm water and building new domestic sewers. This involves changing of roof water drains, and a separate estimate of the cost of these changes has been made by the careful study of a selected region. In the same way estimates for the domestic sewers were made by selecting four typical areas and studying these in detail.

The intercepting sewer must be so deep that it is found most economical to put in considerable portions of it by deep rock tunneling.

The pumping station will have boilers of about 10,000 horse power and will lift the sewage 65 feet.

The sewage disposal works, as designed,

embody grit chambers, settling tanks, trickling filters, final settling tanks and in the latter hypochlorite disinfection will be carried out. The works follow closely, therefore, the Baltimore plans. Before the time comes to build such works, it is quite probable that there will be changes in the art that would render them obsolete.

Settling tanks will have a net capacity of three hours for the normal flow; the trickling filters are to be 6½ feet deep and one acre is to serve a population of 12,500 people. The final settling tanks have a two hours flow at average rate.

At time of high water the trickling filters and final settling tanks will be out of use, and it is intended to treat the sewage with hypochlorite alone. The possibility of entirely omitting the trickling filters is considered. In this case it is deemed necessary to increase the size of the settling tanks. Omitting the filters would result in the reduction of the first cost of works by about 6% or 7%. There would be no saving in the cost of operation as the additional quantity of hypochlorite of lime would offset the saving in the cost of operating the filters. This is based upon the view that the effluent from a sedimentation tank would require 125 pounds of hypochlorite per 1,000,000 gallons, while with untreated sewage double this quantity would be necessary.

After pointing out certain objections to the location of works on the Island the all-important question of cost is taken up. Estimates are made on two bases; first for the city of Pittsburgh only, and with provision for 800,000 population, except in the main and intercepting sewers, which are larger; second, for the whole Pittsburgh district, providing for 1,400,000 in the same way. In the first plan the total estimated cost is $37,300,000 and the annual cost of operation $435,000 which, capitalized at 5% and added to the first cost, gives a total cost of works of $46,000,000. Under the second plan the costs are: construction, $37,000,000; operation, $80,000 per annum; total, $73,100,000.

Acid iron wastes from the mines and spent pickle from the manufacturing establishments tend to modify the effects of sewage pollution in the river and to disinfect the polluted waters. For the present and for many years to come proper methods of treatment will yield satisfactorily good water from the Allegheny and Ohio rivers. The Monongahela has already reached such a state that it is difficult to treat it. Statistics of the cities and towns using the Ohio, below Pittsburgh, for water supply do not show that the water in its present condition cannot be made safe by filtration, just as the water of the Hudson, polluted by the sewage of Troy, Schenectady and other cities is purified at Albany, while with most efficient sewage disposal at Pittsburgh these waters would not be safe for drinking in their raw state. The cost of providing pure water for the entire population under consideration would be extremely small when compared with the cost of installing works for treating the sewage of Pittsburgh. Installing such water-works with proper management would insure a supply of safe water; purifying the sewage of Pittsburgh would make only a slight difference and would not be a material element of the water supply situation in the valley below.

The question of physical nuisance in the stream and particularly of local nuisances about the sewer outlets of the city is studied, and it is concluded that the ordinary flow of the river is more than sufficient to dilute the sewage of the probable future population for a considerable period of years to a point where it is inoffensive. At times of low water flows the acid waters become most efficient in their purifying action. The question of local nuisance is, therefore, a secondary one.

The final recommendations are in favor of the provision of additional sewerage for the Nine Mile Run and the Saw Mill Run districts; for the improvement of sewage outlets and the prevention of local nuisance and for improvements to provide against flooding of sewers in the low-lying regions. In regard to the disposal of the sewage it is recommended that for the present the method of sewage disposal be by dilution in the waters of the Allegheny, Monongahela and Ohio rivers. Dilution is a well-recognized method of disposal of sewage in general use throughout

the civilized world. There is no occasion for the expenditure of many millions of dollars by the city at this time for radical changes in the works or in the methods of disposal.

Messrs. Stearns and Eddy in a brief report indicate that they have carefully considered the plans and estimates prepared by Hazen and Whipple; that they believe all of the features of the plans as set forth are necessary to an effort to protect the water supplies in question by the treatment of the sewage of Pittsburgh; that the execution of this plan will not accomplish the main purpose suggested in the permits of the Commissioner of Health; and that the advantages which would result are not enough greater than the disadvantages to warrant the great cost involved in the construction and maintenance of the works. They, therefore, concur in the opinion expressed by Hazen and Whipple that the city is not justified in undertaking the project.

In his letter of transmissal, Mr. Sprague briefly summarizes these reports and their conclusions and fully concurs in them. The rivers are natural and logical drains formed for the purpose of carrying wastes to the sea. When the amount of such wastes produces a nuisance, it is then time to adopt remedial measure for its abatement. The requirements of the state are held to be unwarranted and would fail to accomplish their purpose.

Earle B. Phelps.

Mass. Inst. Tech.,
Boston, Mass.

A Manual of Practical Hygiene. For Students, Physicians and Health Officers, *by Charles Harrington, M.D., late Professor of Hygiene in the Medical School of Harvard University. Fourth edition, revised and enlarged by Mark W. Richardson, M.D., Secretary to State Board of Health of Massachusetts. Octavo, 850 pages, with 124 engravings and 12 full-page plates, in colors and monochrome. Cloth, $4.50 net. Lea & Febiger, Philadelphia and New York, 1911.*

At the time of Dr. Harrington's death in 1908 he was engaged in the revision of this well-known book and had nearly completed the chapters on Milk and Disinfection, and his manuscript together with the remainder of the book has been brought up to date by Dr. Richardson, his successor as Secretary to the Massachusetts State Board of Health.

The work is divided into nineteen chapters, although many of these are subdivided into sections, comprising Foods, Air, The Soil, Water, Habitations, Schools, etc., Disposal of Sewage, Disposal of Garbage, Disinfectants and Disinfection, Military Hygiene, Naval and Marine Hygiene, Tropical Hygiene, The Relation of Insects to Human Diseases, Hygiene of Occupation, Vital Statistics, Personal Hygiene, Infection, Susceptibility and Immunity, Vaccination and Small Pox, Quarantine and Disposal of the Dead.

Beginning the book with a discussion of foods in general, their nutritive value and composition, the reader is soon engaged in the study of the different foods—meats heading the list and these are considered one by one, then their transmission of disease by meat and fish and the posioning which may occur from the use of spoiled meats.

The next section takes up the study of milk and deals with the constituents, adulterants and methods of testing for same, bacteria, pasteurization, methods of analysis, etc.

Disinfection and disinfectants are fully discussed in a chapter of 110 pages, the various agents being considered.

The chapter on Military Hygiene gives requirements for admission, considers the recruit, his clothing, rations, the camp, disposal of wastes and the diseases to which he is liable, although the latter topic has but just over four pages devoted to it, venereal diseases being dismissed with five and one-half lines.

Each topic is carefully considered and the more important phases emphasized just enough to bring them out.

This book will continue to occupy the place it has long held as a leader in the science of hygiene and is a fitting successor to the earlier editions.

B. L. Arms.

HEALTH DEPARTMENT REPORTS

Chicago, Ill., 1907–1910.

The report of the Chicago Health Department for the period approximately coincident with the commissionership of Dr. W. A. Evans is a remarkable document, perhaps the most remarkable report ever issued by a city department. It is no formal perfunctory record of routine work performed. It is a direct message from a public officer, with a keen sense of responsibility, in which he tells the people of his city what he is trying to do for them and what they themselves should do for their own well-being.

The first section of the report is a review of some important phases of health work by Dr. Evans himself. The principles of sanitary legislation, the problems of housing and ventilation, the disposal of waste, the Chicago water supply and milk supply, the control of contagion, the spread and prevention of the principal communicable diseases, and vital statistics are discussed, each in three or four pages of direct, telling popular writing with citations of important literature, such as Chapin's "Sources and Modes of Infection" and Park and Krumwiede's study of human and bovine tuberculosis. The subsequent sections of the report deal with the work of the different bureaus of the department, contagious diseases, sanitation, laboratory and food inspection, with vital statistics and with the work of publicity and education. The technique of the control of communicable disease and the procedure of sanitary inspection is discussed in detail with reproductions of many of the forms in use. Special features of the laboratory report include studies of the ice supply and of the efficiency of pasteurization. In the section on vital statistics the death rates from principal causes are indicated graphically for every year since 1871. In a brief section dealing with the educational work of the department are reproduced a dozen of the most telling diagrams and cartoons from the well-known *Weekly Bulletin* and other illustrations from the same source are included in other parts of the volume in connection with the subjects with which they deal.

The most notable quality of the report is not the matter it contains, but the manner of treatment. Dr. Evans has infected his associates with earnestness, frankness and readiness to profit by light from any source; and there is scarcely a page in the volume that is not good reading for any one with an interest in public health. Many sanitarians may not agree with all the views set forth. To any health officer, however, who may have grown a little stale in the daily routine of service this report will prove an inspiration, for it will give him a fresh sense that his work is a real and vital one, full of tremendous potencies for human happiness.

C.-E. A. W.

Brockton, Mass., 1911.

The 30th Annual Report of the Department of Health of Brockton, Mass., recently issued, shows the good work done in that city to protect the health of its citizens. In the general remarks special note is made of the housing situation. It is pointed out that Brockton as yet has not reached a point that its housing problem cannot be easily controlled, but warning is made that within a few years, with the increasing population, conditions may arise which will be both difficult and expensive to adjust. The department is thus alive to the dangerous possibilities and will doubtless take steps to see that bad conditions are not allowed to arise. It is, indeed a hopeful sign of the times when Health Departments are taking proper cognizance of bad tendencies and thus checking dangerous potentialities which unchecked would be the despair of future generations of health officers.

The communicable disease record for 1911 was very satisfactory, diphtheria and typhoid

fever being very low. There were 635 deaths, giving a rate of 11.26 per 1,000. It is to be regretted that the International Classification of Causes of Deaths is not used or that rates are not worked out for the deaths from the various important communicable diseases. There were 108 deaths of infants under 1 year, a rate of 92 per 1,000 births.

The work of the Laboratory is well presented by Mr. George E. Bolling. This Laboratory might well be taken as a model for other cities of this size.

Jacksonville, Fla., 1911.

The Annual Report of the Board of Health of this city for 1911 is a splendid one and is a public document of which the citizens of Jacksonville should well be proud. It is only the second annual report issued by this city but is far ahead of those issued by many cities which have had modern health departments for many years. Dr. Charles E. Terry, the health officer, indicates the sanitary status of the city in a very strong and lucid manner and does not mince words when it seems necessary. The crude death rate was 21.4 and the resident death rate 17.75. There was a reduction of 171 cases and 22 deaths in typhoid fever as compared with 1910, a reduction of 35%, and Dr. Terry attributes this in a large measure to the passage and enforcement of an ordinance regulating the construction and maintenance of dry closets. The importance of flies as disseminators of typhoid is discussed in some detail and the results of the investigations along this line are well shown. (*See article by Dr. Terry on this subject, this Journal January, 1912.*)

Much work has been done to remove all mosquito breeding places and Medical Inspection of Schools was inaugurated during the year. The population of the city is estimated at 63,641 and the total cost of the Health Department amounted to $33,382.66. 76.1% of the dairy farms supplying milk to the city scored under 60 in January and not in single one in December. There was a corresponding decrease in the bacteria in the milk. A total of 147,155 inspections were made by the 15 sanitary inspectors, during the year.

Space prohibits referring to many of the important results obtained by the Department during the year. The report is recommended to health officers for their perusal and inspiration.

The Milk Supply of New Brunswick, N. J.

Under the title of *Where We Get Our Milk* the New Brunswick Board of Health has recently issued a special bulletin for the benefit and use of the milk consumers of that city. The Bulletin gives (1) the score of each milk producer and general remarks with regard to the sanitary conditions under which the milk is produced and handled; (2) the score of the milk dealers who distribute milk and notes concerning their equipment and methods; (3) the results of inspection of ice cream factories and a list of the material used in its manufacture; (4) tables showing the chemical and bacteriological tests of milk; and (5) information for housewives so that they may be able to keep the milk properly after delivery.

More and more health departments are taking steps to give the necessary publicity with regard to the milk supplies of their cities, and are developing the necessary courage to print the names of producers and dealers with a fair statement of the methods used by them. The method used by New Brunswick seems to be of wide application, particularly for small communities, and the publicity should result in much greater improvement than could be hoped to be obtained by inspection and analyses alone.

PUBLIC HEALTH NOTES

Governor Wilson and Sewage Disposal.

Not wishing to join in the Passaic Valley Sewerage District for financial reasons, the cities of Orange and East Orange and the town of Montclair, N. J., secured land in the neighboring towns of Bloomfield and Belleville, and proposed to dispose of their sewage there with Imhoff tanks and trickling filters. Thereupon Bloomfield and Belleville, backed by those who wished to see Orange, East Orange and Montclair forced into the Passaic trunk-sewer scheme, went to the Legislature and secured a bill prohibiting any city or town from building sewage-disposal works in another municipality without first having obtained the consent of the authorities of such other municipality.

Governor Wilson vetoed this bill because he was convinced that it was based on a most unsafe and unscientific principle. The governor pointed out that questions of sewage disposal should be settled not by neighborhood preferences and jealousies, but by the scientific rules of sanitary engineering, and not with reference to political divisions, but to the topography of the country. He asserted that the State Board of Health should be able to protect political divisions against any deleterious influences resulting from sewage-disposal within their limits, and if its present powers are not sufficient they should be engaged to cover the case.

Eng. News, April 18, 1912.

Bakery Inspection in New York.

Commissioner of Accounts Fosdick has recently made a report to Mayor Gaynor on the conditions of New York bakeries; 145 bakeries of all classes were inspected and defects of location, ventilation and methods of handling were noted in many instances. Personal uncleanliness was most marked in many cases and the law regulating bakeries was frequently violated; particularly those sections prohibiting sleeping in bakeries and the use of tobacco. Conditions in the factory bakeries were found to be generally good.

Mr. Fosdick recommends the amendment of the sanitary code so as to place the inspection of bakeries in the hands of the Health Department in place of the State Department of Labor which now has jurisdiction.

The following suggestions looking towards improving the existing conditions are made:

1. All bakeries to be licensed by the Board of Health.

2. No rooms less than nine feet between floor and ceiling, and no rooms with floors over four feet six inches below the sidewalk level, to be licensed as bakeries.

3. A specific sanitary standard to be observed in all bakeries.

4. Bakeries to be carefully and regularly inspected, both before and after the license is obtained.

5. The Board of Health to have power to close and seal any bakery not conforming to its orders after forty-eight hours' notice.

Experimental Leprosy in Monkeys.

Doctors Duval and Couret contribute a further note upon the experimental production of leprosy in the monkey in the March 1st issue (Volume XV, No. 3) of the Journal of Experimental Medicine. These investigators were able to induce experimentally in a monkey fatal leprosy with all the clinical and pathological manifestations that are noted in cases in men, by the inoculation of a pure culture of the acid-fast bacillus, cultivated by Duval from a leprous lesion in man. In order to do this, however, it was necessary to give the animal repeated injections of large numbers of leprosy bacilli at given intervals for a period of months. It was noted that infection of laboratory animals was more likely to follow when the animals had been sensitized. They assume that the first injection, which may consist of either killed or viable lepra bacilli, caused the sen-

sitization of the animal, and suggest that the necessity of first sensitizing monkeys and then giving repeated doses of the micro-organisms over a long period of time, might explain the fact that man rarely contracts leprosy, although intimately associated for an indefinite period with those afflicted with the disease.

The authors conclude that the production of leprosy in the monkey proves conclusively that the acid-fast bacillus cultivated from a human lesion is the true leprosy bacillus and not some extraneous saprophyte, and that it is the etiological factor in human leprosy.

The article is illustrated with pictures of cultures of B. leprae and also with photographs of the monkey showing leprous lesions.

Perspiration and Tubercle Infection.

"Professor Poncet has communicated to the Paris Academy of Medicine the results of experiments regarding the transmission of tuberculosis by perspiration. After bringing about a profuse perspiration in consumptive patients by means of hot-air douches, Professor Poncet made a careful examination of the perspiration and discovered that 42 per cent. contained tuberculosis microbes. Thus, he alleges, the danger of contagion from the clothes of persons suffering from tuberculosis, or from objects touched by them, is very great, and in the future stricter sanitary measure must be taken. All the clothes and objects touched by the patient must be disinfected without exception, and the strictest isolation observed. He points out that his observations add to the many reasons for the prevention of overcrowding. Professor Poncet concluded his report by saying that since the tuberculosis bacillus can leave the body by the skin it can probably enter in the same manner, wherefore a severe hygiene for the skin is to be recommended."

The Medical Officer, April 6, 1912.

Notification of Infectious Diseases.

"For a number of years the Boston Board of Health has been making a vigorous effort to obtain as complete reports as possible of the existence of those infectious diseases in the city which physicians are obliged by statute law to report. Several notices were sent to the physicians of the city calling their attention to this law, and requesting that these reports be sent in all cases to the Board. In spite of this, however, in the year 1909 it was found that 324 cases of pulmonary or laryngeal tuberculosis were not reported, the first intimation of their existence being the presentation of the death certificates. An investigation was made of all these cases and in a great majority it was found that physicians had been called and had made one or two visits. Other cases were reported by medical examiners, and quite a number from hospitals, the cause of death being discovered on autopsy. In 1910 there were 328 cases, and in 1911 but 63 cases, thus neglected. This improvement in reporting followed the prosecution of physicians who were found to be attending cases of tuberculosis and not reporting them. During the present year, 1912, but 14 cases have been found not reported up to April 1. These have all been investigated, and as a result two physicians have been summoned into court. One has been fined $50, the minimum fine which the court can impose on cases found guilty, and the other case is pending.

It is not the desire of the Board of Health to prosecute any physicians, but it is its determination to have these reports full and complete, in conformity with the law. It feels that in no other way is it possible to deal with and control this disease. The Board hopes that the physicians of the city will realize its position in this matter and the importance of their submitting reports on contagious diseases as required by law. Otherwise it feels it a duty to proceed against them, if in no other way it can obtain this information. Physicians reporting infectious diseases will greatly aid the Board in its work if they will carefully fill out the returns, giving information on all the details requested."

Editorial, *Boston Medical and Surgical Journal*, April 18, 1912.

National Conference on Pellagra.

In response to invitations from the State Medical Association and the State Board of Health of South Carolina, the National As-

sociation for the Study of Pellagra will hold its next triennial meeting in Columbia, S. C., October 3rd and 4th, 1912, the week following the Washington meeting of the XV International Congress on Hygiene and Demography. Invitations are extended to all persons interested in pellagra to participate in this meeting. The co-operation of officers of the Government Medical Services, State Boards of Health and State Hospitals for the Insane are especially solicited. It is expected that several foreign governments and medical organizations will be represented at the conference. Persons wishing to present papers should address the special committee, consisting of Drs. J. W. Babcock, J. J. Watson and J. H. Hayne, Columbia, S. C.

Heredity and Tuberculosis.

"Professor Karl Pearson delivered a lecture on 'Tuberculosis—Heredity and Environment' at the Galton Laboratory of National Eugenics on Tuesday, March 12th. Professor Pearson threw three pedigrees of family phthisis on the screen, illustrating how phthisis may attach itself to a family for from four to seven generations. He pointed out that this might be attributed to: (a) a hereditary constitutional factor, which rendered the members of the family specially liable to risk; (b) an environment factor, as living in the same house or following the same occupation; (c) direct infection from one generation to a second. As a rule either (a), (b) or (c) were without further investigations adopted according to the *a priori* conviction of the interpreter. Such pedigrees, however, required much more careful analysis. Thus, in the two German pedigrees shown, 62 per cent. of the tuberculous members lived to adult age, 45 per cent. married, and in these marriages only 12 per cent. of the persons who married into the stocks were tuberculous. In the third pedigree a generation had twice been skipped, and the stock (of the landed gentry class) had lived in three different countries and homes besides seeking change of climate and occupation to avoid the family curse. Obviously, such facts needed careful study, not dogmatic treatment. Clearly they had to inquire whether persons living habitually in the same environment and with practically the same risk of infection had the same chance of developing phthisis.

Continuing, Professor Pearson said that the actuarial work of Elderton and Perry did not indicate any marked improvement in the mortality of any class of consumptives who had undergone sanatorium treatment on the death-rates of the same class in pre-sanatorium days. A school of medical opinion spoke of sanatoria as being necessary and efficient 'schools of hygiene.' This might hold for their middle-class patients, but, as shown by the reports of the Local Government Board of Scotland on the administrative control of pulmonary phthisis in Glasgow, it was not true for the lower classes. He held that there existed as yet no concrete knowledge of what sanatoria had or had not achieved. It was cruel to go to the public with glowing accounts of their curative value when they were conscious that their sole service might be the 'school of hygiene' for, or the aggregation of, those advanced cases which were undoubtedly infectious and largely hopeless. The dispensary system must chiefly be judged at present by its effect in Edinburgh. In Edinburgh itself, before the introduction of the dispensary, there were big drops in the death-rate, and since the introduction of that dispensary, other Scottish towns without any such system had exhibited equal or greater declines in their phthisis death-rates. The dispensary system might be doing excellent work, but the evidence for it could not be provided by citing the fall in the Edinburgh death-rate.

In summing up, Professor Pearson said that when they studied the fall in the phthisis death-rate; when they noticed this fall taking place alike in urban and rural districts, alike with or without sanatorium or dispensary treatment; when they say that it started long before the introduction of such treatment and had not been accelerated by increased medical knowledge, then they were compelled to regard that fall as part of the natural history of man, rather than as a result of this attempt to better environment."

The Medical Officer, March 23, 1912.

"Cats and Diphtheria."

"Dr. Adkins, medical officer of health of Devon, reporting on the outbreak of diphtheria in the village of Coleridge, states the district medical officer of health was able to find evidence of infected cats having been the source of the disease. Four cats had died from throat trouble, one being the pet of the first 'case' affected."

Public Health, April, 1912.

Human Engineering.

This magazine, edited and published by Dr. Winthrop Talbot of Cleveland, is essentially a magazine for employers, published to provide a means of exchanging experiences on the human side of industry and a forum for the discussion of the conservation of human energy.

An editorial in the April number points out that "It is a magazine not of philanthropy, but of industrial management and intelligent thrift in its modern and broadest sense." All students of Industrial Hygiene and Diseases of Occupation will find much of interest in this magazine. Amongst the contributors to the April number may be mentioned: Dr. Luther Gulick, Hon. G. v. L. Meyer, Secretary of the Navy, John Calder, Manager of the Remington Typewriter Works, J. B. Andrews, Secretary of the American Association for Labor Legislation.

Hypochlorite at Kansas City.

Mr. Walter M. Cross, city chemist of Kansas City, Mo., contributes a short article on *The Hypochlorite Sterilization of the Kansas City Water Supply* in the April 25th issue of the Engineering News. Mr. Cross points out that the city water, which is sedimented, but otherwise untreated Missouri River water, is at times badly polluted and unsafe to drink. This fact caused many people to use the clear and sparkling waters that issue in many places from springs and wells, and in most instances these waters are at least ten times as badly contaminated as the city water. Consequently, on account of its questionable character, the city water became possibly a direct and certainly an indirect cause of disease.

Since the beginning of 1911 the city water has been treated with hypochlorite, the dose being a little over 15½ c. a million gallons. Mr. Cross gives a table which shows that in 1910, before treatment, there were 107 deaths from Typhoid Fever in the city as against 61 for 1911 after disinfection had been installed. Bacteriological experiments showed that the raw water contains anywhere from 4,000 to 10,000 bacteria per c.c. and the water after treatment as delivered to the city anywhere from 20 to 100 with all tests for B. coli negative.

Ventilation Inspectors.

"We are very much pleased to learn of the creation of a ventilation bureau in Chicago, consisting of a chief inspector and four assistant inspectors.

"That the new bureau is to be administered along broad lines and that the best man obtainable is desired, is evidenced from the fact that the examination for the principal position will be without regard to legal residence in Chicago. The date has not yet been set, but the Commission desires to obtain, if possible, the kind of man who is not alone competent for the present necessities of the bureau, but who will be able to develop it as such a bureau should be handled in the next few years on account of the increasing attention given to ventilation matters."

Engineering Review XXII, No. 3.

Typhoid Carrier on Shipboard.

The Journal of the A. M. A. for May 1911 publishes an investigation of typhoid fever among sailors, made by Dr. W. A. Sawyer of the State Board of Health of California, due to a typhoid carrier in the crew of a lumber ship. Twenty-six cases of the disease occurred on the S. S. Acme scattered over a period of three and a half years. A winch-driver, who had been aboard during the entire series of cases and who had had typhoid in 1908, was suspected to be the cause of the series of cases and examination of his feces lead to the isolation of the typhoid bacillus. The opportunities for infection on board

ship are well discussed by the author and stress is laid on the extremely poor sanitation that is frequently to be noted on ships. Dr. Sawyer emphasizes the need for bacteriological examination of the feces and urine of typhoid fever patients and points out that if this winchman had been subject to such an examination the cases (there were four deaths) would have been prevented.

An important point is made of the fact that the cultures freshly isolated from the stools failed to be completely agglutinated by anti-typhoid serum even in dilutions as low as 1–50. In the eleventh transplantation of the cultures, organisms were obtained that were completely agglutinated in dilutions of 1–4000.

Frequency of Tuberculous Infection in Children.

"Although some 30 years have passed since the discovery of the bacillus of tuberculosis, no absolute certainty exists as to the exact way in which infection is most commonly produced. Koch's original opinion, that inhalation of organisms derived from human disease is the important factor, still commands pretty general assent, but another school has arisen which holds that infection starts in infancy by consumption of tuberculous milk, the bacilli lying latent until some depression of vitality in after life gives them a chance to multiply and cause serious disease. In view of the existing doubt it is important to obtain trustworthy information as to the frequency of tuberculous infection in infants and children and as to the apparent portal of entry of the germs. As to the frequent occurrence of tuberculous food in children authorities are agreed, statistics derived from post-mortem examinations giving a percentage of infected cases varying from 35 in London (Still) to 42.5 in Christiania (Harbitz). Attempts to obtain further information by the employment of the tuberculin test have also been made, the results confirming the view as to the frequency of infection in children. A recent investigation on these lines has been carried out by Dr. Charles M'Neal and recorded in the *Edinburgh Medical Journal* for April. The investigation concerned a series of 541 cases, 371 of those being children in the Royal Edinburgh Hospital for Sick Children and the others 170 boys in an industrial school. The methods of employing the tuberculin was a modification of von Pirquet's procedure, undiluted 'old' tuberculin being rubbed into an abraded point of skin. The results obtaned showed, even with the first year of life, a percentage of infection of 14.1, the ratio rising till it attained a height of 46.6 in the fourth and fifth years of life. Among the boys of the industrial school, drawn from the most necessitous classes, the percentage of infection actually reached a figure of 64.7 in boys aged 15 years. It was remarkable, in comparing the figures with those recorded by von Pirquet and others in Austria, that whereas the general mortality from tuberculosis in the latter country is much higher than in Scotland (36.25 compared with 12.53), in Edinburgh the percentage of infection among children was actually greater. The more frequent occurrence of abdominal tuberculosis among children in Great Britain suggests that infection by tuberculous milk may be the factor which explains the unfavourable conditions thus revealed."

The Lancet, April 13, 1912.

Pellagraphobia.

Dr. George M. Niles of Atlanta, Ga. contributes a short article in the May 4, 1912 issue of the Journal of the A. M. A., against the growing unreasoning fear of pellagra which is apparently present in some parts of the south. Dr. Niles states that he is "morally certain that pellagra is due to a active toxicochemical poison generated in spoiled maize, and becoming active after being injected in the human body. He also points out that the evidence is against infection or contagion, and that "it is the consensus of opinion of the majority of thoughtful observers of pellagra that the most efficient prophylactic measures consist in the avoidance of corn products, unless the corn is known to be sound, abstention from alco-

bodies of all kinds, reasonable care in eating, and all those hygienic precautions calculated to keep the body up to par and in a resistent state." He concludes that "the object of this article, therefore, is to request the profession at large, while assuming a judicial attitude toward the unsolved problems of pellagra, and realizing the possible gravity of the situation, not to permit the seeds of an immoderate fear among the laity to take such root, that they may grow into a wide-spread pellagraphobia, a consummation earnestly to be deprecated."

Typhoid Death Rates as Criteria of Water Supplies.

A recent editorial in the Engineering News gives an interesting digest and criticism of Dr. A. J. McLaughlin's recent paper on "The Necessity for Safe Water Supplies in the Control of Typhoid Fever." In this paper the author has compared typhoid rates in American cities with those of certain Northern European cities. The excess of the American figures is suggested to be due to the inferiority of their water supplies, and further suggests 5 per 100,000 as a normal rate for a city with an unpolluted supply.

The News, while heartily endorsing the purpose of the paper—the improvement of American water supplies,—believes, "that Dr. McLaughlin should have gone further in his statistics or not so far in attributing the low European typhoid rates to pure and the high American rates to impure water supplies." The News points out that "other capacious vehicles exist, particularly in the southern part of the United States, and probably under high temperatures generally," and emphasizes the fact that we need in this country improved methods of board of health control of contagious disease before we can hope to reach the normal typhoid rate suggested by Dr. McLaughlin.

Editorial, Eng. News, Apr. 18, 1912.

Septic Sore Throat in Baltimore and Chicago.

Dr. Louis P. Hamburger, contributes a preliminary note in the April 13th issue of the Journal of A. M. A. on the appearance in Baltimore of septic sore throat, "the new and very terrible disease" which assumed such serious proportions in Boston last year. The Boston epidemic was studied thoroughly by Professor C.-E. A. Winslow and as a result of his investigation a certain milk supply was implicated as the vehicle of the infection. Dr. Hamburger made an investigation of 25 households in which the disease had occurred and found that they had a common milk supply. This dairy was selling milk pasteurized by the "flash" process; they immediately raised the temperature of pasteurization to 160 F and installed a system on the "holder" principle within a week. The cases which occurred later were apparently "neither so severe nor so numerous, do not follow the milk supply, but occur in prosodemic fashion; namely they appear to be transmitted from individual to individual through various channels of communication." It was noted that for a month preceding the outbreak, the milk in question was not being pasteurized owing to repairs being made in the pasteurizing room. A statistical study of the disease is now being made and will be awaited with interest.

Doctors Miller and Capps contribute a preliminary note in the same issue on an epidemic of sore throat due to milk in Chicago. An investigation is being carried on by these observers with the co-operation of the Health Department.

Will Make Babies Immune.

A new and unique work in the anti-tuberculosis campaign is the dispensary for babies opened recently by the Tuberculosis League of Pittsburgh on the South Side of that city at 93 S. 15th Street. The primary object of the dispensary is to attempt to create an early immunity among the babes and children that will prevent the infection during infancy and childhood; and thereby to prevent the outbreaking of active tuberculosis in later life. Dr. William Charles White, Medical Director of the League, under whose supervision the work will be carried on, says that it will probably be ten years before the definite results of this

experiment may be appreciated. Commenting on this movement, the Bulletin of the League for March says:

"Practically all tuberculosis infection begins in childhood. In view of this it is felt by the Tuberculosis League that probably money can be better spent in a limited district by taking care of children from the time of their birth and preventing infection in this way than by taking care of them after the State has spent money on their education and care, only to have them finally develop Tuberculosis; thus necessitating a long period of rest and care."

"Not only the sick but also healthy children are taken charge of by the institution. The theory of the society is that by fortifying the body in the earliest period of a child's life the infant will, to a large extent, become immune from the disease with which heredity and environment threaten it. For this purpose special cognizance is taken of the babies' home surroundings."

Instruction will also be given to mothers at the dispensary and everything that can be done to decrease infant mortality in this district will be attempted.

The South Side of Pittsburgh, where the dispensary will work, is naturally separated from the rest of the city, thus making it easy to keep records of the results obtained. The Wyoming Valley Society for the Prevention and Treatment of Tuberculosis at Wilkes-Barre (Pa.) in its work with mothers and babies through its milk committee, has one of the nearest approaches to the Pittsburgh experiment tried in this country.

Clinical Thermometers as Disease Spreaders.

The March number of the Bulletin of the North Carolina State Board of Health reprints from the Journal of the American Medical Association a paper by Dr. E. B. Beasley on "The Clinical Thermometer as a Possible Disseminator of Some Communicable Diseases." It is shown that the etchings on the ordinary clinical thermometer form ample harbors for large numbers of bacteria and that these are not removed by the ordinary process of plunging the thermometer into a glass of water for a momentary agitation or by holding the thermometer under the tap.

Experiments carried out with pure cultures of Bacillus prodigiosus and Bacillus pyocyaneus show conclusively that these bacteria were not removed by the ordinary methods of cleansing thermometers and indicate most forcibly that sterilizing solutions of marked power should be employed by physicians for the disinfection of their thermometers after each use. Since the bacteria can survive after the thermometer is fairly well washed, dried and placed in a case for several hours, it is evident that certain diseases such as scarlet fever, diphtheria, typhoid, tonsilitis, pneumonia, and tuberculosis, as well as many others, might conceivably be disseminated in this way.

Formaldehyde is recommended as a satisfactory disinfectant for use with thermometers and a further suggestion is made that a reliable clinical thermometer should be a part of the equipment of a household.

Compulsory Segregation Law Passed.

The New Jersey bill providing for compulsory segregation of tuberculosis, has been signed by Governor Wilson and is now in force. The law is without doubt the most advanced state legislation on tuberculosis that has ever been enacted in this country, if not in the world.

The new law provides that tuberculosis patients who refuse to obey the regulations laid down by the State Board of Health concerning the prevention of their disease, and thus become a menace to the health of those with whom they associate, shall be compulsorily segregated by order of the courts, in institutions provided for this purpose. If such a patient refuses to obey the rules and regulations of the institution in which he is placed, he may "be isolated or separated from other persons and restrained from leaving the institution." The State Board of Health, working through the local boards is given the power to enforce the provisions through the courts. The law further provides that all counties in the State of New Jersey shall within six months from April 1st, make provision in special institu-

tions for the care of all persons having tuberculosis in these counties. The state treasury will subsidize each county to the extent of $3.00 a week for each person maintained in these institutions except those who are able to pay for the cost of maintenance.

The only other state which provides for compulsory segregation of dangerous cases of tuberculosis, is Maryland. The only city in the United States which has adopted a special ordinance providing for compulsory removal of dangerous tuberculosis cases, is San Francisco. A few other cities, such as New York, exercise this power under certain provisions of their sanitary codes, but no other city has any special ordinance on the subject.

New Jersey now has two county hospitals in operation, one in building and one about to be started. It is expected that the new law will materially increase the number of such institutions because of its mandatory character. Anti-tuberculosis workers will also watch with much interest the way in which the provisions for compulsory segregation and detention work out.

Rocky Mountain Health Association.

The Colorado State Association for the Prevention and Control of Tuberculosis, has changed its name to the Rocky Mountain Health Association, and will aim materially to extend the scope of its operations. The field of work, will be the Rocky Mountain states, and while special emphasis will be given to tuberculosis work, other lines of health work will also be undertaken.

Viability of Typhoid Bacilli in Sour Milk.

The Michigan Agricultural Experiment Station has carried out during the past year an extended series of tests to determine the effect of lactic acid upon the typhoid bacillus in milk. This has been done in view of the suggestions sometimes made that milk which is possibly infected with typhoid bacillus might be fermented and used as a soured milk for drinking purposes because of the action of the lactic acid upon the typhoid germ.

The purpose of the paper therefore, is to determine the viability of the typhoid bacillus in sour milk in the presence of different types of acid-forming organisms. The acid produced by lactic organisms is shown to have an inhibitive influence on typhoid bacillus but the results are not sufficiently conclusive to permit the statement that milk possibly infected can be rendered safe through the activity of the acid-forming organisms. It is shown that the minimum acidity produced by Bact. lactis acidi which will destroy bacillus typhosus is 80° in milk and 28° acid in whey. For Bact. bulgaricum the figures are 28° acid in milk and 66° acid in whey. Since these are high degrees of acidity which, because of the presence of other organisms, might not be attained even with vigorous cultures of acid-producing bacilli, it would seem to be evident that milk in which there was any suspicion of typhoid infection should be destroyed or thoroughly disinfected and that until our knowledge is more definite we should not attempt to secure the inhibition or destruction of typhoid bacillus through the agency of lactic acid.